

# NATIONAL

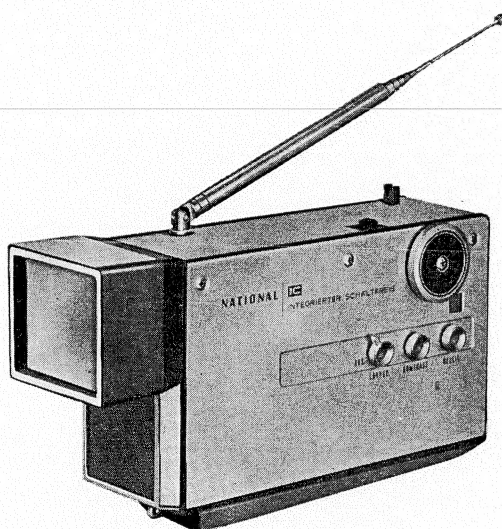
## Service Manual

ORDER NO. FTD 701001



### PERSONAL PORTABLE TELEVISION RECEIVER

## MODEL TR-001EU



### SPECIFICATIONS

Power Input Rating	DC : 5V, AC : 220V 50Hz with AC Adaptor TY-196E	Heater Voltage 2.0V Heater Current 90mA
Power Consumption	DC : 1.7W, AC : 9.5W max. with AC Adaptor TY-196E	3.8cm dynamic
Antennas	VHF and UHF Rod antenna : 75 Ohm Unbalanced VHF and UHF External antenna : 75 Ohm Unbalanced	Max. 100mW Peak AGC AVR (Automatic Voltage Regulator) AOCP (Automatic Over Charge Protector)
Channels	VHF 2-12 ch., UHF 21-69ch., CC1R standard	Automatic Noise Canceller
IF. Frequency	Video 38.9 MHz Sound 33.4 MHz	Height : 11cm
Integrated Circuits	11	Width : 6cm
Transistors	8	Depth : 19cm (with front hood)
Thermistor	1	895g (with Battery)
Diodes	24	1 (NATIONAL Nickel Cadmium Battery Pack TY-701E)
H. V. Rectifier	1 block (11 diodes)	
Picture Tube	IVABP4/S4047 36° deflection, aluminized 7cm <sup>2</sup>	

〈EXPORT DIVISION〉

**MATSUSHITA ELECTRIC TRADING CO., LTD.**  
P. O. BOX 288, Central Osaka, Japan

**MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.**  
**FUJISAWA TELEVISION DEPARTMENT**

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# 1. ADJUSTMENT LOCATIONS

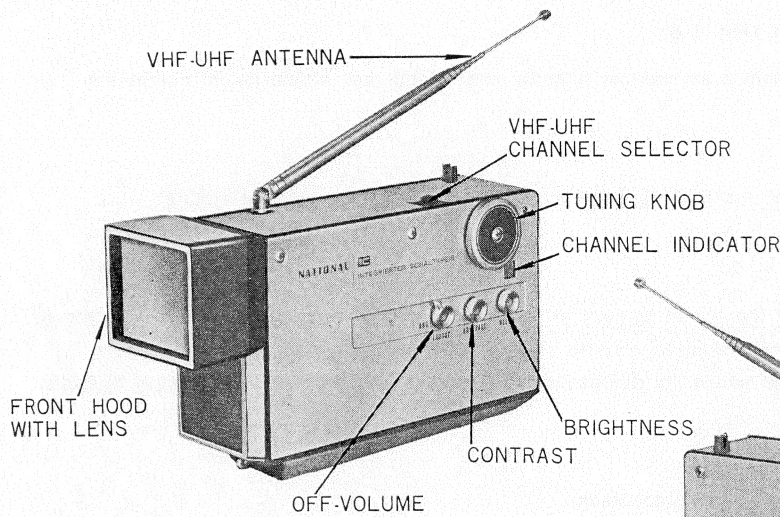


Fig. 1-1

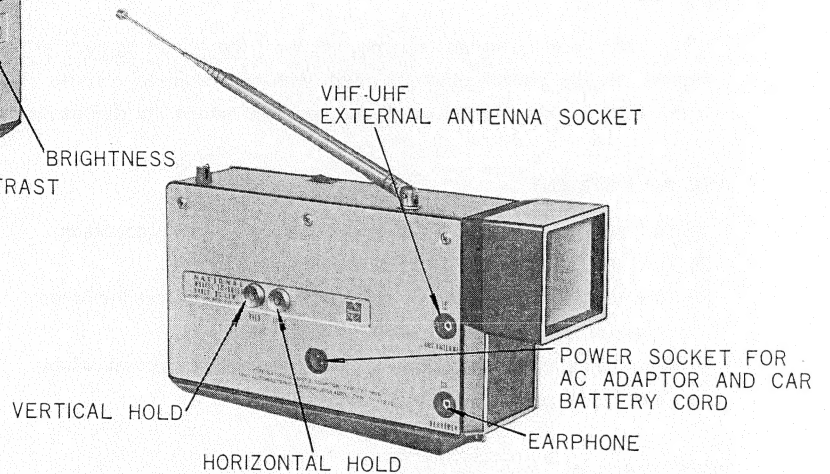


Fig. 1-2

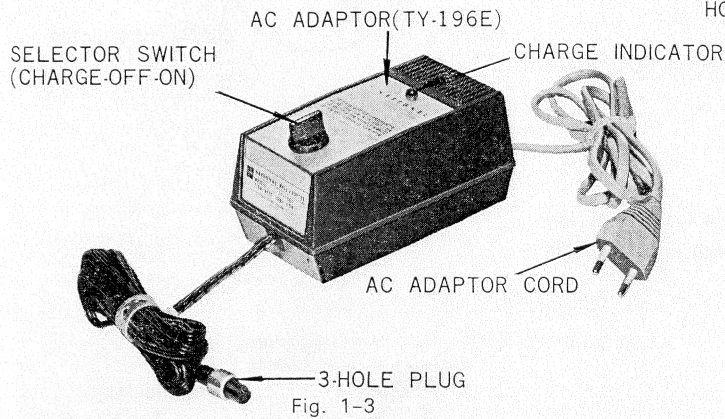


Fig. 1-3

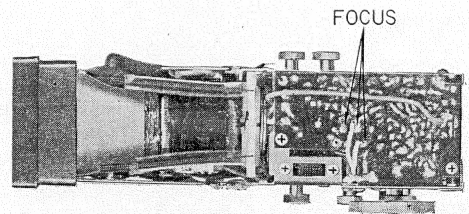


Fig. 1-4

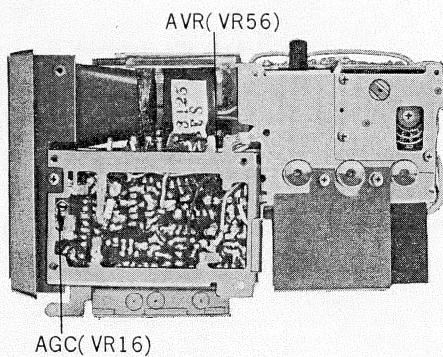


Fig. 1-5

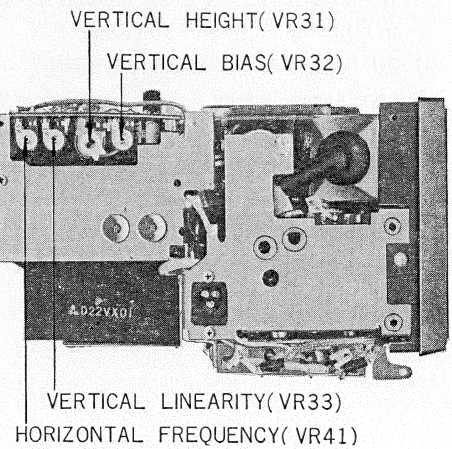


Fig. 1-6

## 2. RECEIVER ADJUSTMENTS

### VERTICAL HEIGHT AND VERTICAL LINEARITY (Fig. 1-6)

Set the power supply voltage to 4.5V, maintain a satisfactory linearity and extend the vertical height completely.

### FOCUS (Fig. 1-4)

Change focus voltage to 0 V or 40 V or 80 V and make adjustment for the sharpest and clearest picture.

### AGC (Fig. 1-5)

If the AGC knob is turned counterclockwise, the operating point of AGC changes to actuate the noise canceller through sync signals, so you cannot obtain a good, well-synchronized picture. This also results in a wiggle in the picture.

If the AGC knob is turned clockwise, receiver sensitivity decreases to a point where reception is no longer possible.

### AGC ADJUSTMENT

- 1) Turn the receiver on for reception in normal reception areas.
- 2) Turn the contrast knob to the maximum position.
- 3) Turn the AGC knob (VR16) until the pattern contrast indicator shows black and white in proper contrast.
- 4) After adjustment, see if the picture becomes abnormal when selecting a specific station.

### YOKE POSITION

If the picture is slanted loosen the yoke clamp screw and make adjustment as required.

### CENTERING

The picture centering device consists of two rings located at the rear of the yoke assembly. Turn each ring until the picture is properly centered on the CRT.

### ANTENNAS (Fig. 1-1 & Fig. 1-2)

#### 1) BUILT-IN VHF and UHF ROD ANTENNA

In normal reception areas, the built-in antenna provides a sharp and clear picture and good sound.

#### 2) OUTDOOR VHF and UHF ANTENNA

An outdoor antenna should be used in an area where reception is of poor quality. Connect the antenna lead-in wire to the terminals of the matching unit (TNQ 311 with small coaxial cable), whose cable with a terminal should be connected to the terminal of the outdoor antenna.

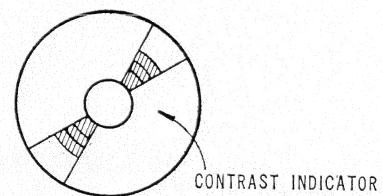


Fig. 2-1

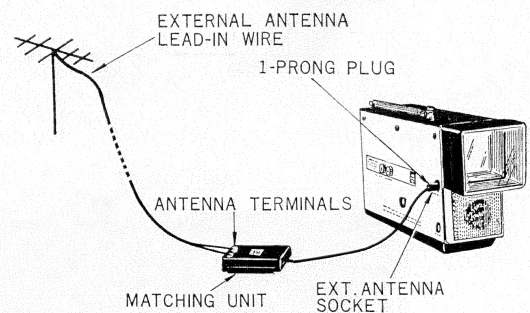


Fig. 2-2



### 3. DISASSEMBLY INSTRUCTIONS

#### CABINET

\* Remove the front hood with lens before the following disassembly.

- 1) Remove the battery compartment cover from the rear and take battery out.
- 2) Remove three screws **A**, four screws **B** and three screws **C** shown in the photo. (Figs. 3-1, 3-2, 3-3)
- 3) Remove 6 control knobs.
- 4) Disconnect the lead from the antenna terminal inside the cabinet by heating with a soldering iron.
- 5) The cabinet can now be removed easily.

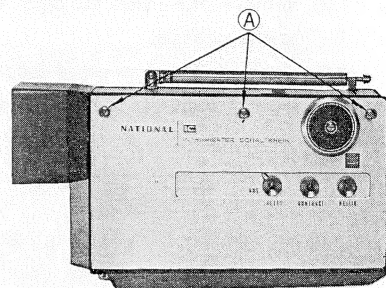


Fig. 3-1

#### ESCUTCHEON

- 1) Remove two screws **D** and two other screws **E** shown in the photo. (Fig. 3-4 & Fig. 3-5)
- 2) The escutcheon can now be separated easily from the chassis.

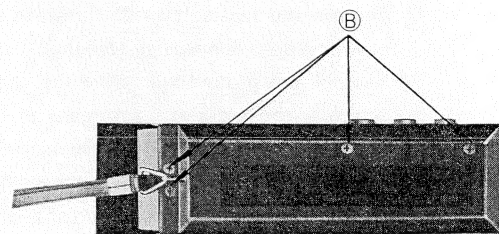


Fig. 3-2

#### PICTURE TUBE

- 1) After removing the cabinet, separate the escutcheon from the chassis.
- 2) Remove the CRT socket and anode cap.
- 3) Unsolder the blue, red, green and yellow yoke lead wires.
- 4) Remove two upper and two lower springs which connect the yoke with the escutcheon.
- 5) The CRT can now be removed easily.

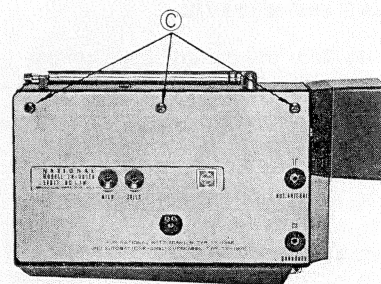


Fig. 3-3

#### SPEAKER

- 1) Separate the escutcheon from the chassis.
- 2) Remove the screws that fasten the speaker and disconnect the leads from it.
- 3) The speaker can now be removed easily.

#### INSPECTION OR REMOVAL OF CIRCUIT BOARD

A) VIF, Video output, SIF, Sound output section (TNP 1122-21)

- 1) Remove the cabinet.
- 2) Separate the escutcheon from the chassis.
- 3) Remove the two screws **H** shown in Fig. 3-7.
- 4) Remove the four nylon moldings which secure the printed circuit board to the chassis.
- 5) Unsolder the connected leads.
- 6) The circuit board can now be removed easily.

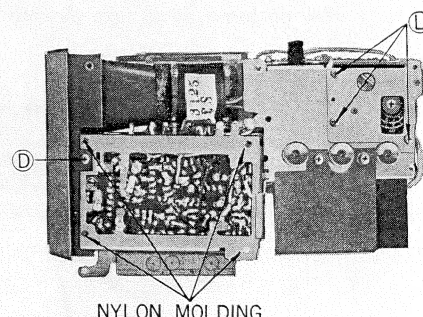


Fig. 3-4

#### B) Deflection section (TNP 1317-1)

- 1) Remove the cabinet.
- 2) Remove the two screws ⑯ shown in Fig. 3-6
- 3) Remove one nylon molding which fastens the printed circuit board to the chassis.
- 4) Unsolder the connected leads.
- 5) The printed circuit board can now be removed.

#### C) FBT section

- 1) Remove the cabinet.
- 2) Remove the deflection printed circuit board TNP 1317-1
- 3) Remove the two screws ③ shown in Fig. 3-6 and take the channel selector switch off the chassis.
- 4) Remove the two screws ⑩ and two screws ① shown in Fig. 3-7.
- 5) Unsolder the leads connected to the following terminals of TNP-1122-21: E<sub>1</sub>, S, J, M, L, O<sub>1</sub>, C, D, K, R, W.
- 6) Remove the two screws ① shown in fig. 3-8 and then the external power supply connecting terminal.
- 7) Remove the ground wire from the chassis shown in Fig. 3-8. Unsolder the red and black leads of the high-voltage rectifier.
- 8) Remove the one screw ⑫ shown in Fig. 3-8 and the three screws ① shown in Fig. 3-4. And remove the tuning mechanism.
- 9) Loosen the mounting nut for the printed circuit board shown in Fig. 3-5.  
The printed circuit board can now be pulled rearward off the chassis.

#### BATTERY REMOVAL

- 1) Turn the battery compartment cover screw on the rear side counterclockwise and remove the battery compartment cover.
- 2) Push the battery cartridge forward and upward.

#### AC ADAPTOR

- 1) Pull the top selector knob upward until it comes out.
- 2) Remove two lower screws ⑭ shown in Fig. 3-9. The case can now be removed to take out the inside.

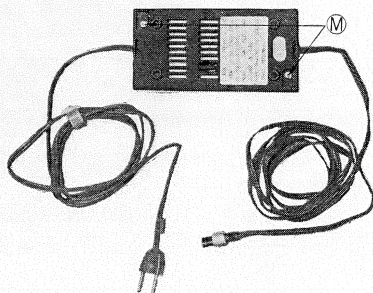


Fig. 3-9

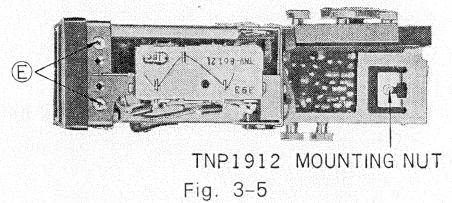


Fig. 3-5

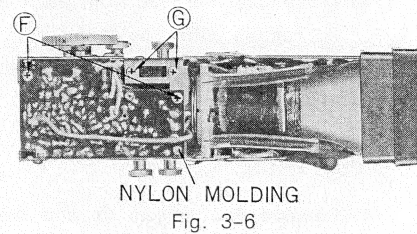


Fig. 3-6

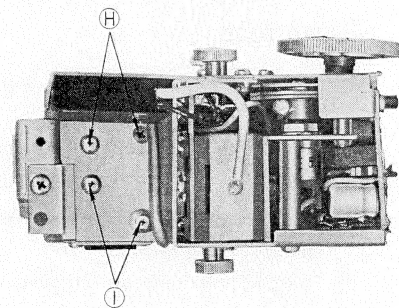


Fig. 3-7

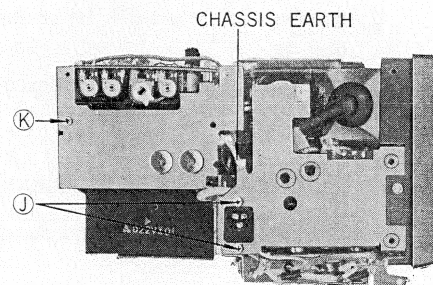


Fig. 3-8



## 4. ALIGNMENT INSTRUCTIONS

### VIDEO IF ALIGNMENT

#### (I) TEST EQUIPMENT CONNECTIONS (Fig. 4-1)

- Oscilloscope ..... (V) Connect to the IC 12 ⑨ (TP. 3) with a 10K $\Omega$  resistor in series with the center wire of the shielded cable.
- (H) Connect to the Sweep Generator to obtain horizontal deflection.
- Sweep & Marker..... (1) Unsolder the junction of IC 16 terminal ④ and C155.
- (2) Apply AGC bias to the terminal T of the printed circuit board TNP 1121-21 through the AGC bias circuit.
- (3) Set the channel selector switch to VHF 2~4 and set the channel selector to the low end.
- (4) Connect the sweep and marker generators to the VHF tuner test point (TP. 2)

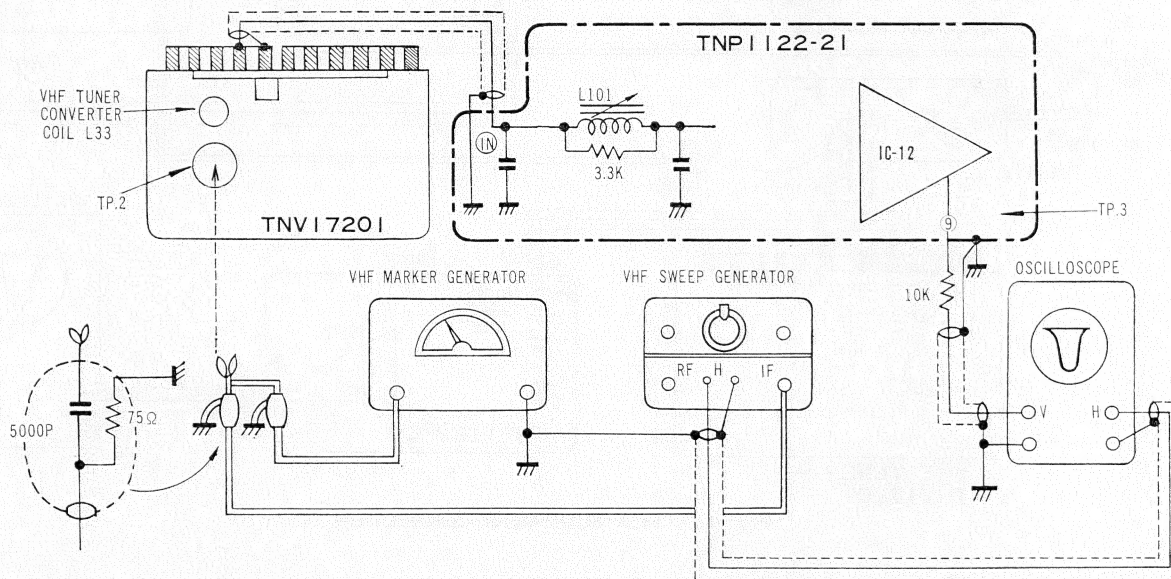


Fig. 4-1 TEST EQUIPMENT CONNECTIONS

#### (II) ADJUSTMENTS

- (1) Set AGC bias to 1.2 volts.
- (2) Adjust the sweep output level to obtain about 300mV p-p on the response.
- (3) Adjust both L101 (input coil) and L33 (tuner converter coil) to obtain the correct response curve as shown in Fig. 4-2.

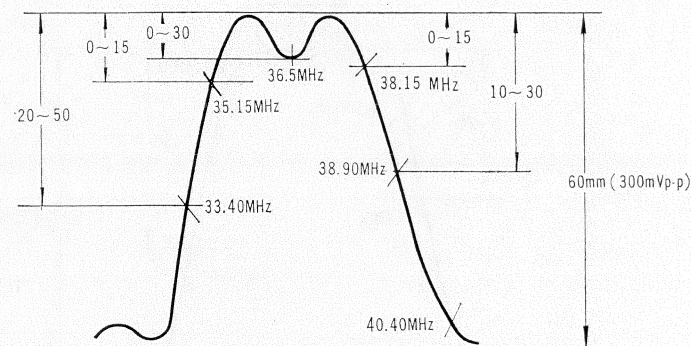


Fig. 4-2

## UHF-VHF TUNER COUPLING ALIGNMENT (Fig. 4-3)

### (I) TEST EQUIPMENT CONNECTION

Oscilloscope ..... (V) Connect to the test point (TP. 3) of the printed circuit board TNP 1122-21 with a  $10K\Omega$  resistor in series.

(H) Connect to the sweep generator to obtain horizontal deflection.

UHF Sweep Generator ..... Connect to UHF tuner input (UHF tuner input impedance  $75\Omega$  unbalanced)

VHF marker Generator ..... Connect to UHF tuner output with a  $10pF$  capacitor in series. Excessive marker injection will distort the response curve.

Apply AGC bias to the terminal T of the printed circuit board TNP 1122-21. Set the channel selector switch to UHF 21~69 and adjust the channel selector to Channel 49.

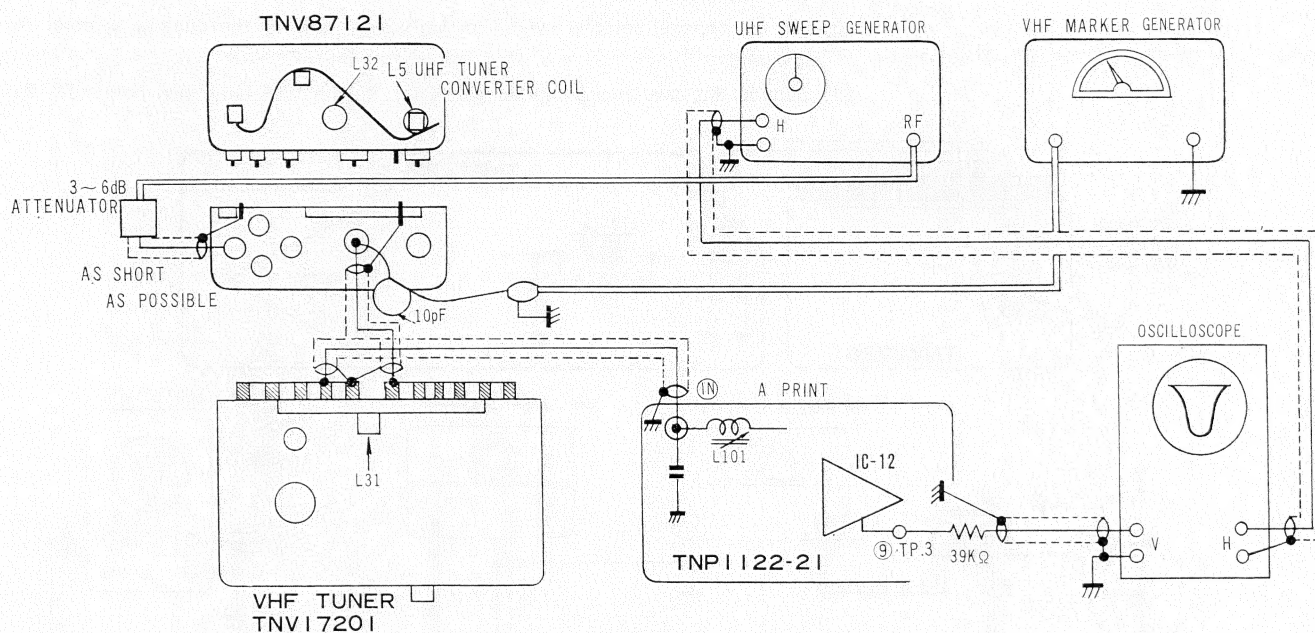


Fig. 4-3 TEST EQUIPMENT CONNECTION

### (II) ADJUSTMENTS

- (1) Set AGC bias to 1.2Volts.
- (2) Set the center frequency of the sweep generator to 700 MHz.
- (3) Adjust the channel selector to obtain the response curve.
- (4) Adjust the sweep output level to obtain about 300mV p-p on the response.
- (5) Adjust both L31 (VHF tuner IF coil) and L32 (UHF tuner converter coil) to obtain the correct response curve as shown in Fig. 4-4.

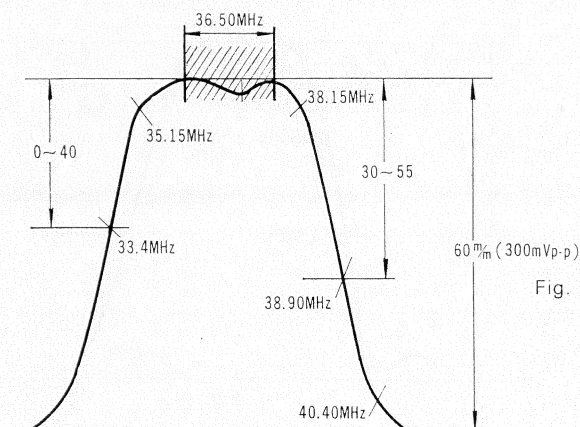


Fig. 4-4



## SIF ADJUSTMENT

\* Disconnect R154 and C155.

Oscilloscope ..... Disconnect the blue lead attached to the M-mark foil on the printed circuit board TNP 1122-21 and connect it to the vertical shaft of the oscilloscope.  
Turn the knob to max.

Sweep marker ..... Connect the sweep output to the terminal ⑦ of IC12.

Adjustment..... Confirm "S" curve is max. (Adjustment Coil: L201, L202, L203)

## AFC ADJUSTMENT

- (1) Turn the TV on.
- (2) Disconnect the junction of R403 (47K) and C405.
- (3) While watching the screen, turn VR41 (2KB) until the picture appears normal. (VR52 and H. Hold knob may be at any position.)
- (4) Connect R403 (47K) and C405.
- (5) Turn VR52 and H. Hold knob to see that there is always proper synchronization.

## AVR

- (1) Turn the TV on.
- (2) Connect a Voltmeter across the terminal ⑥ of the printed circuit board TNP 1122-21 and the ground.
- (3) Turn VR56 to regulate voltage (4V).

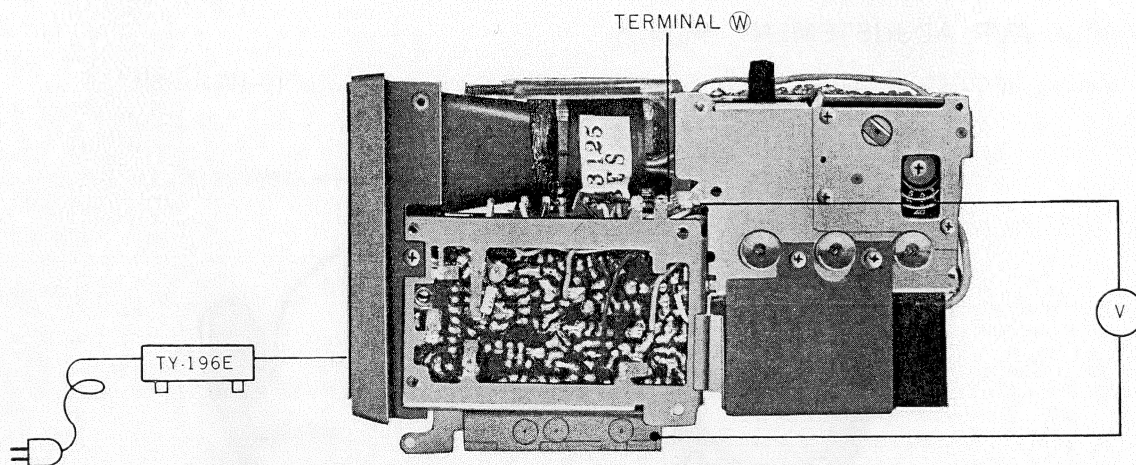


Fig. 4-5 TEST EQUIPMENT CONNECTION

## TY-196E AUTOMATIC OVERCHARGE PROTECTOR ALIGNMENT (Fig. 4-6, 4-7)

- (1) Set the DC power source voltage to 5.9V under 25°C circumstance temprature and set to 6.0V under 20°C(External units)
- (2) Turn the VR72 of TY-196E clockwise all the way.
- (3) Set the selector of TY-196E to CHARGE.
- (4) Turn VR72 counterclockwise to a point where ③ suddenly drops to 0 and the pilot lamp goes off.

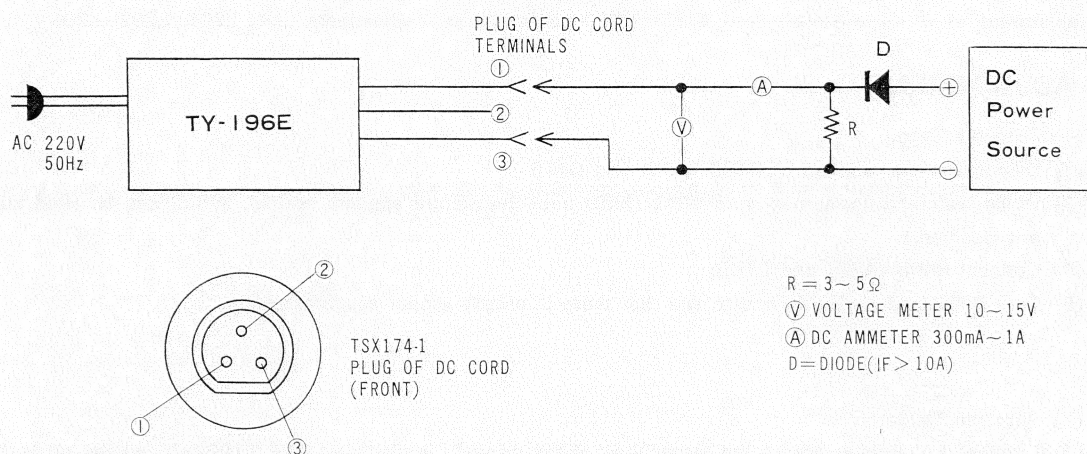


Fig. 4-6

## TY-196E AVR ADJUSTEMENT (Fig. 4-7)

Actuate TR-001EU by TY-196E and adjust VR71 until the DC output voltage of TY-196E is 5V.

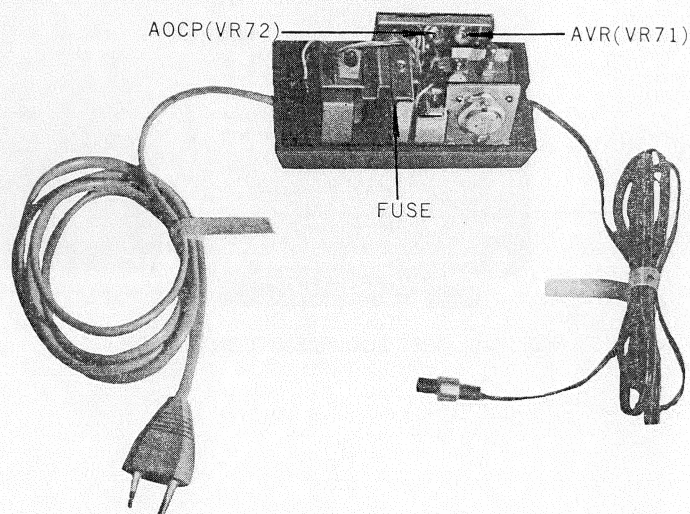


Fig. 4-7 TEST EQUIPMENT CONNECTION

## 5. WIRING DIAGRAM

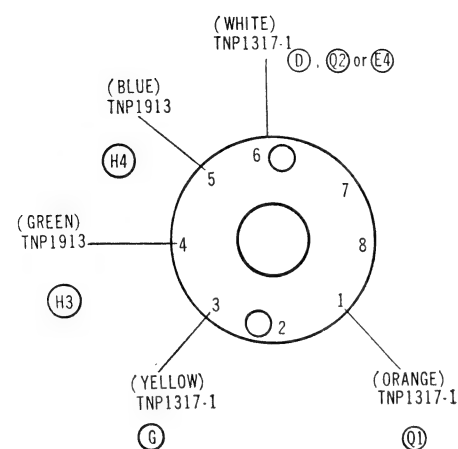


Fig. 5-1 PICTURE TUBE SOCKET

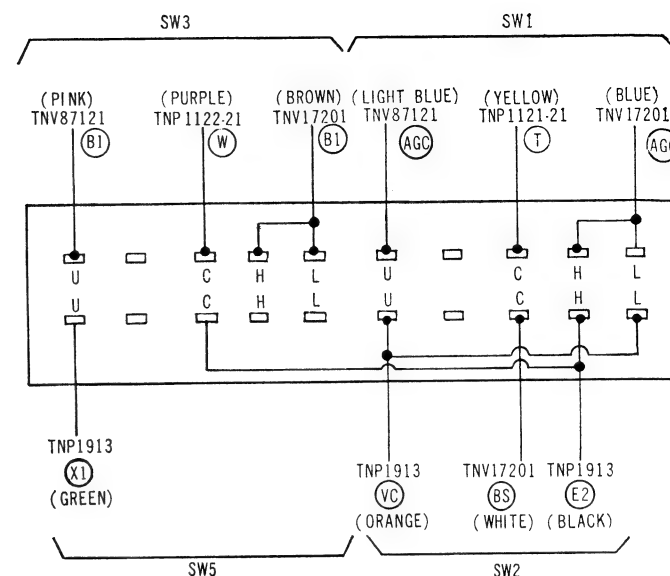


Fig. 5-2 CHANNEL SELECTOR SWITCH (BOTTOM VIEW)

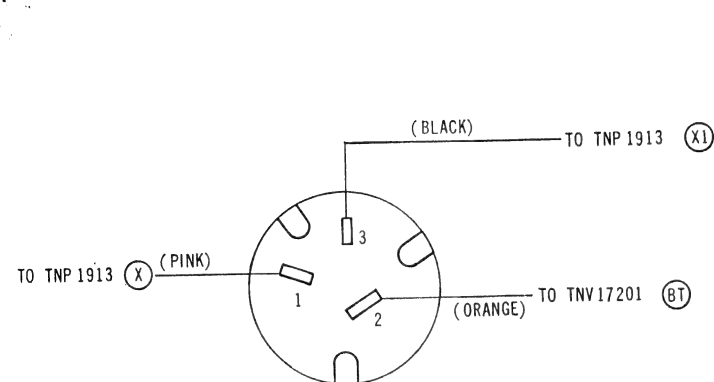


Fig. 5-3 TUNING VOLUME (REAR VIEW)

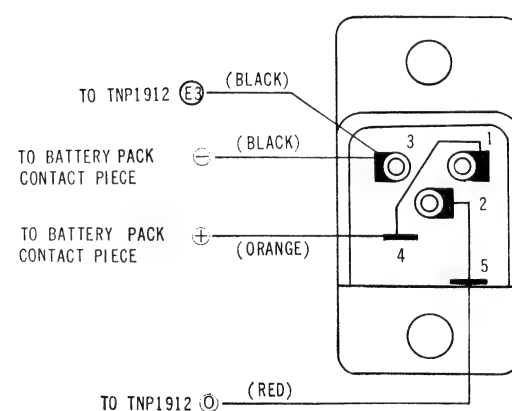


Fig. 5-4 3P POWER SOCKET (REAR VIEW)

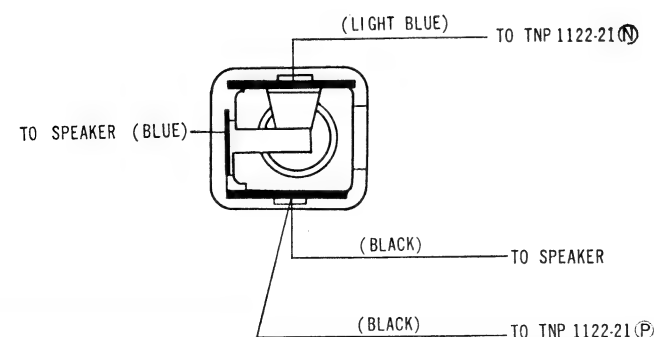


Fig. 5-5 EARPHONE SOCKET (REAR VIEW)

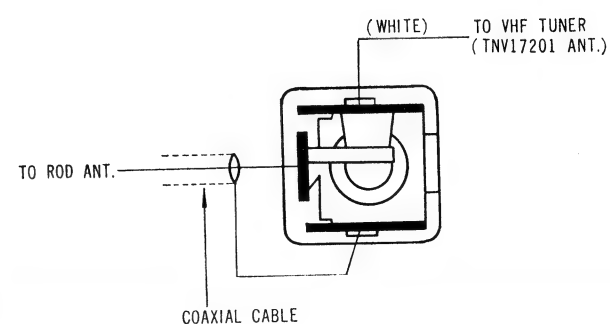


Fig. 5-6 ANTENNA SOCKET (REAR VIEW)

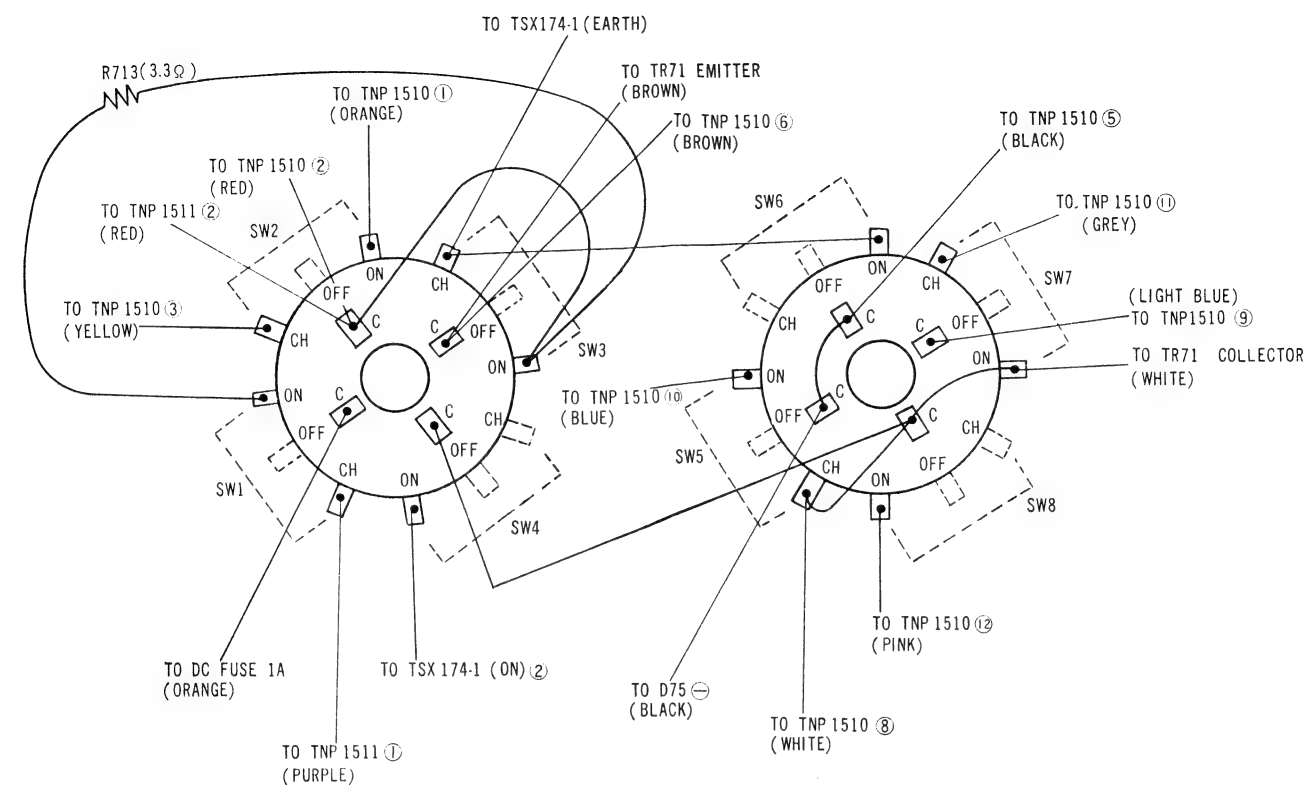


Fig. 5-7 AC ADAPTOR ROTARY SWITCH

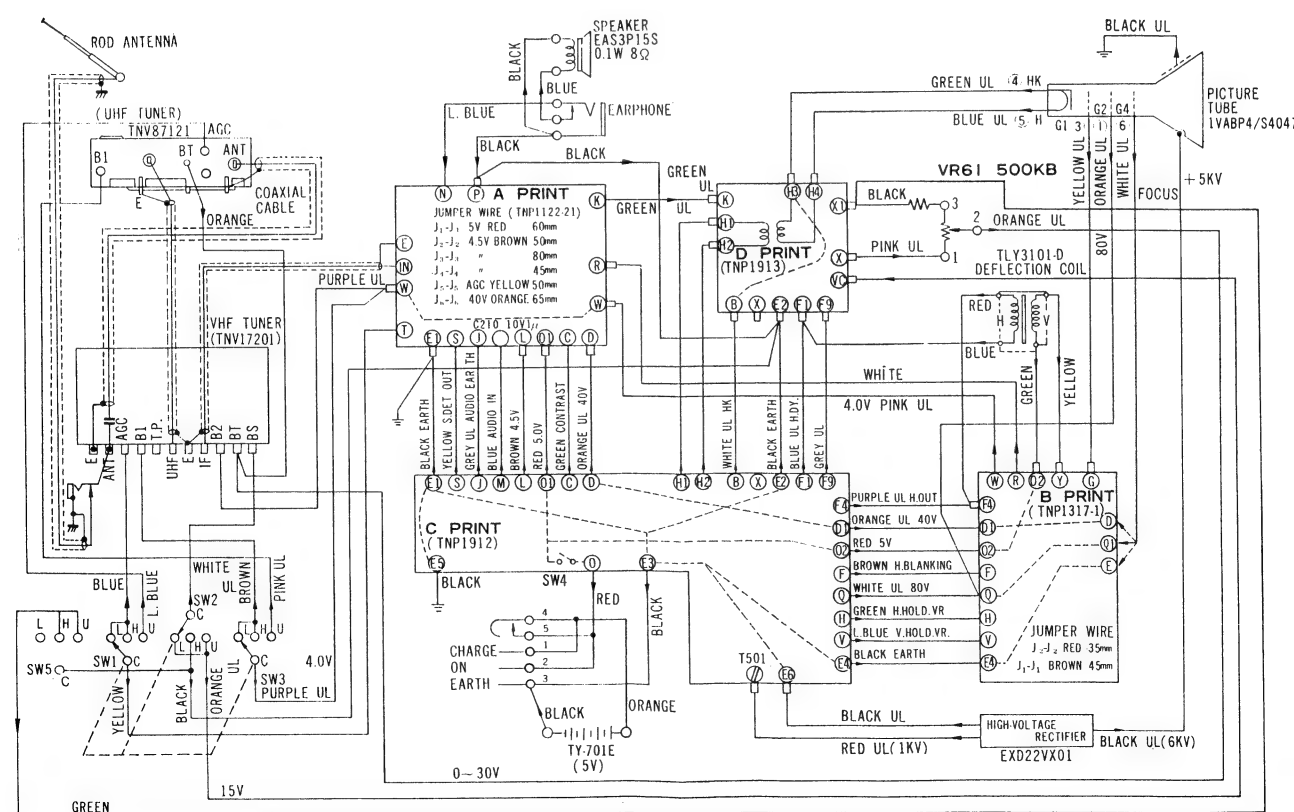


Fig. 5-8



6. BLOCK DIAGRAM

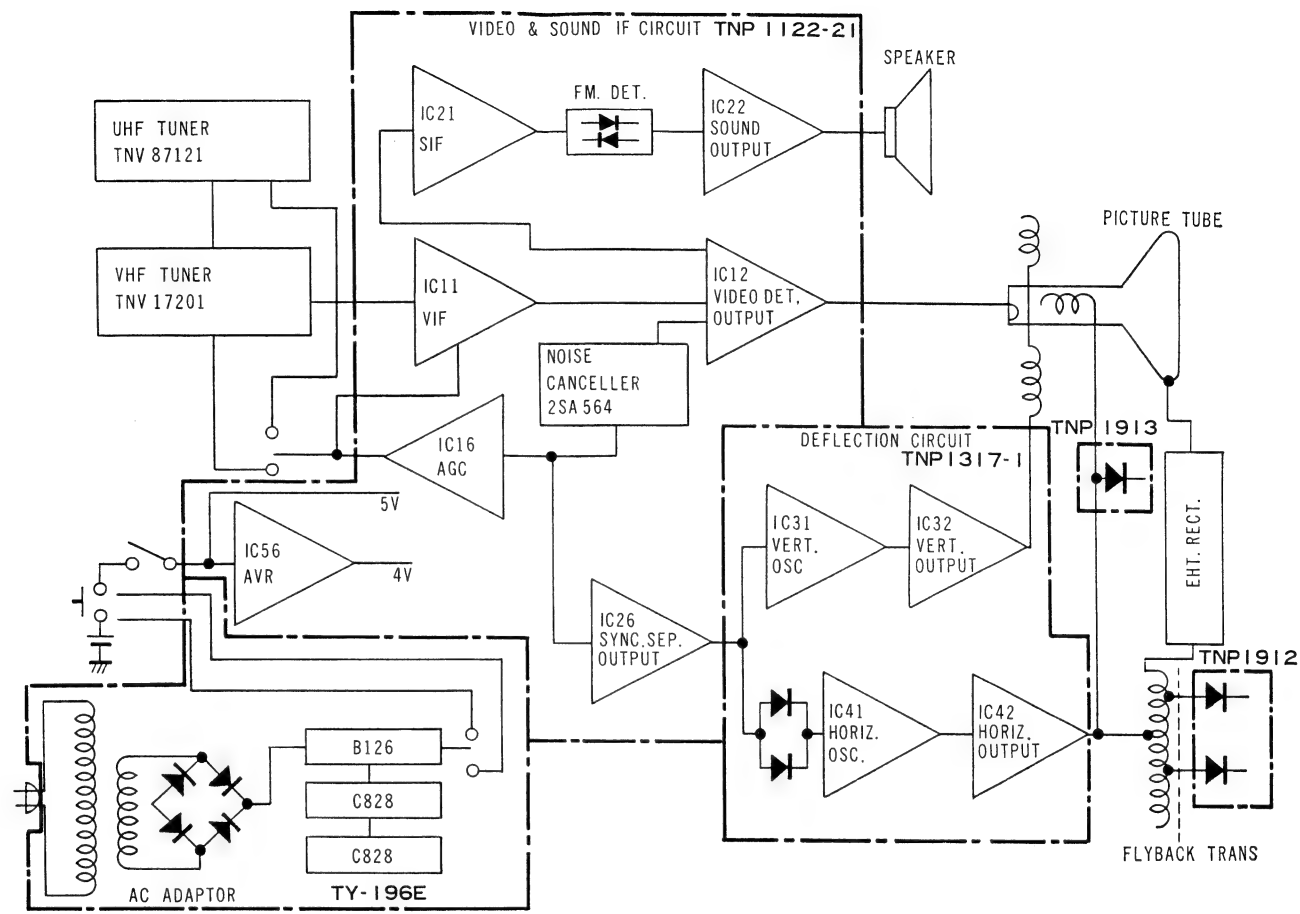
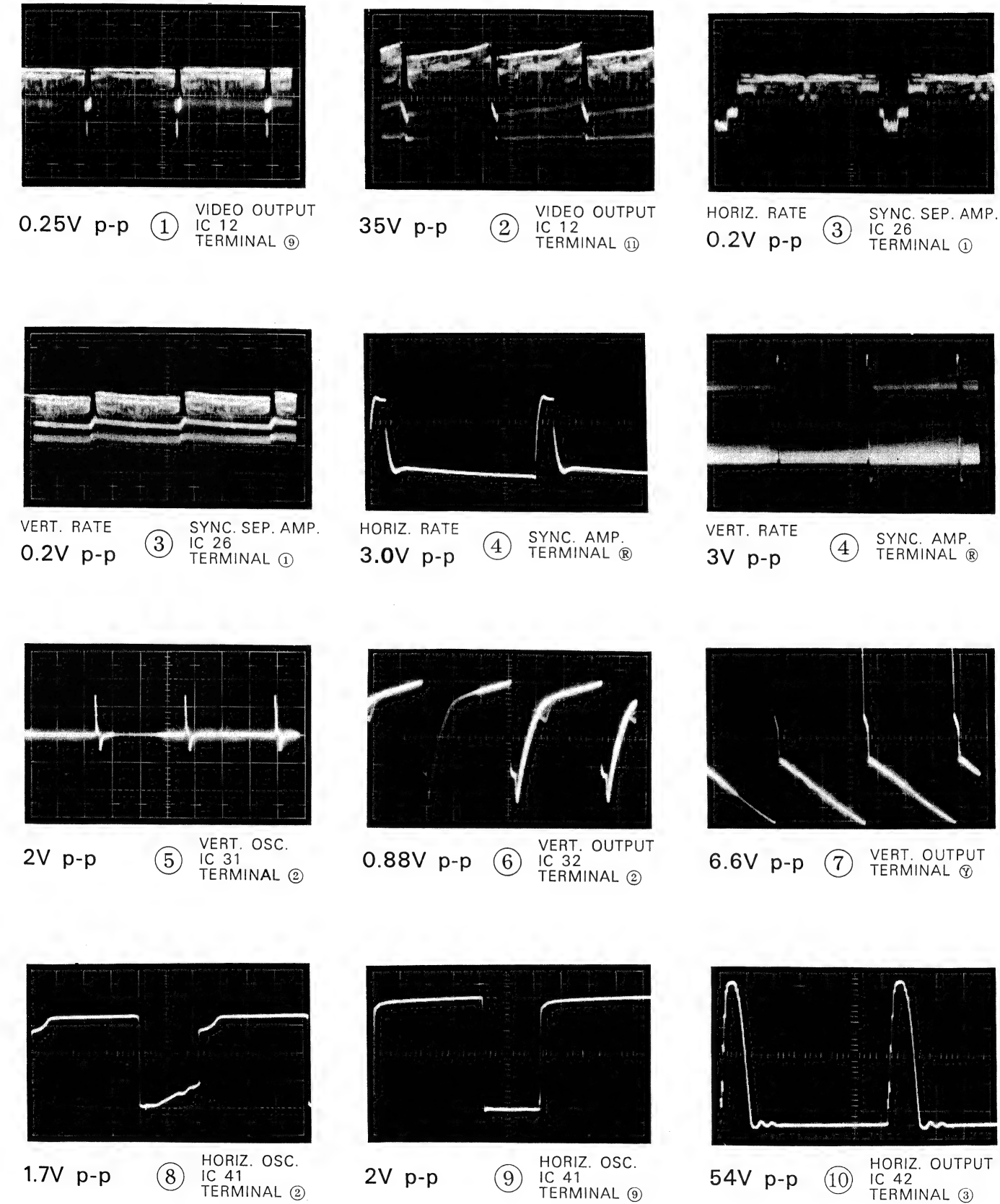


Fig. 6-1

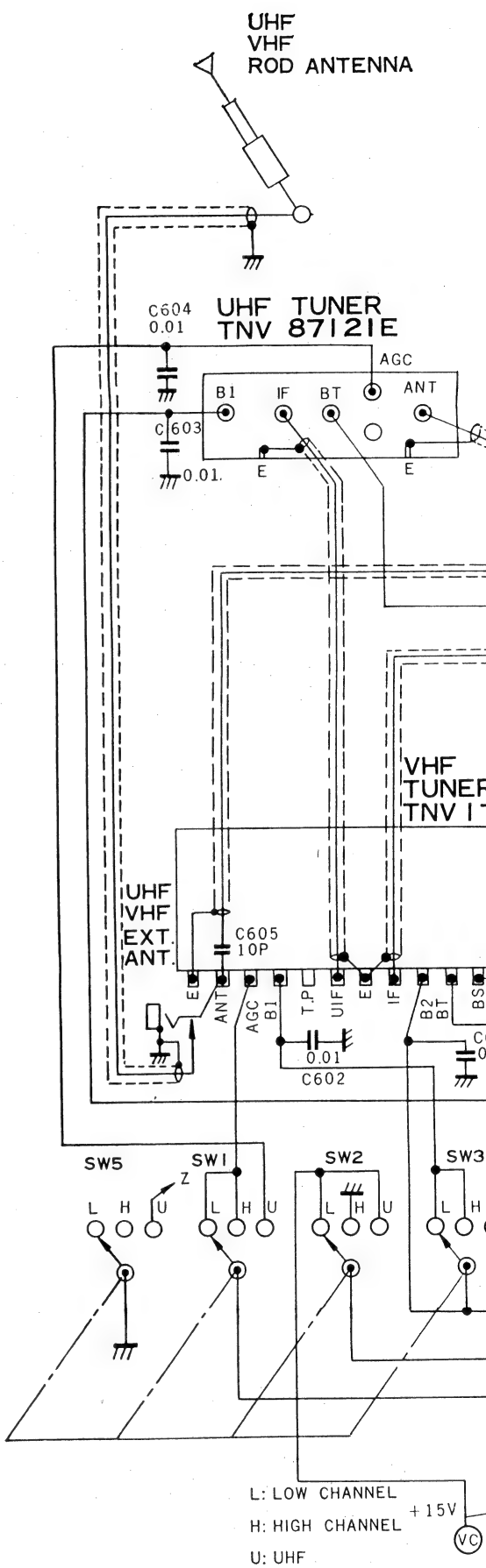
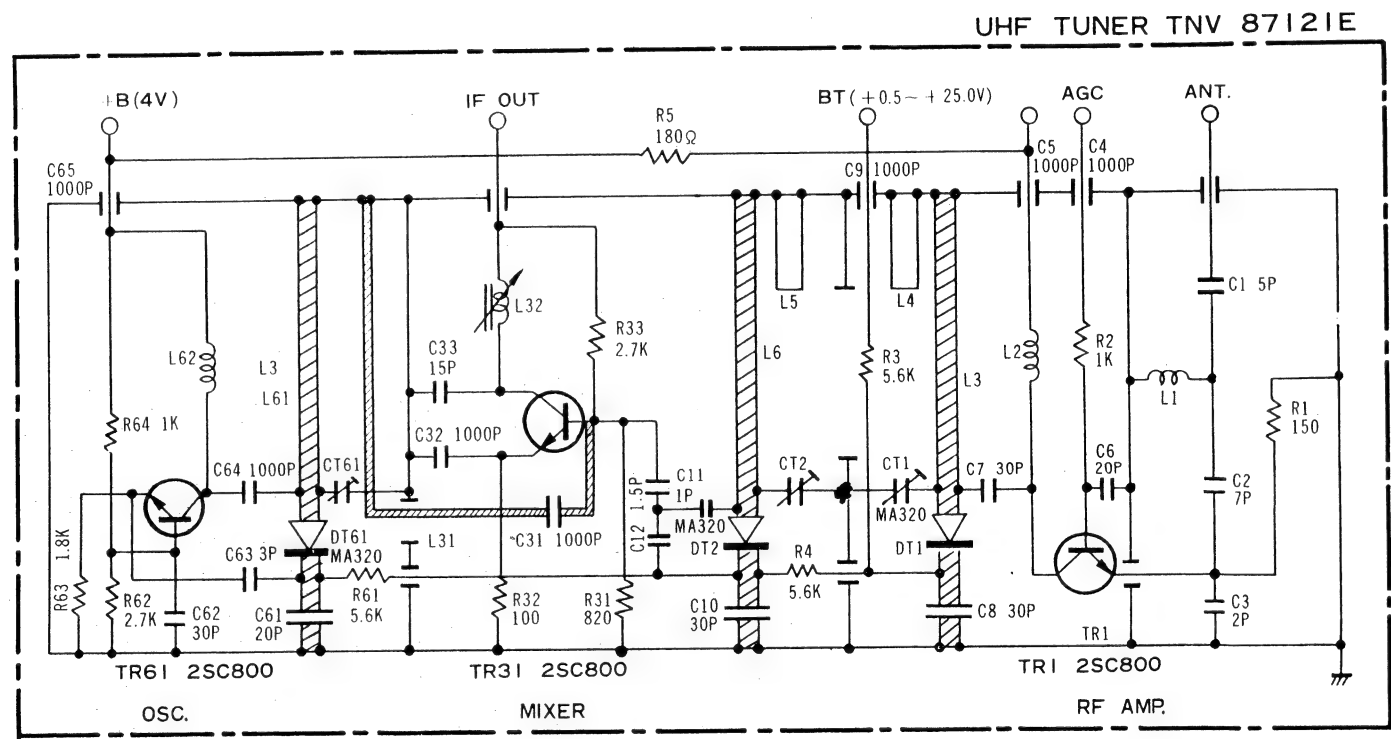
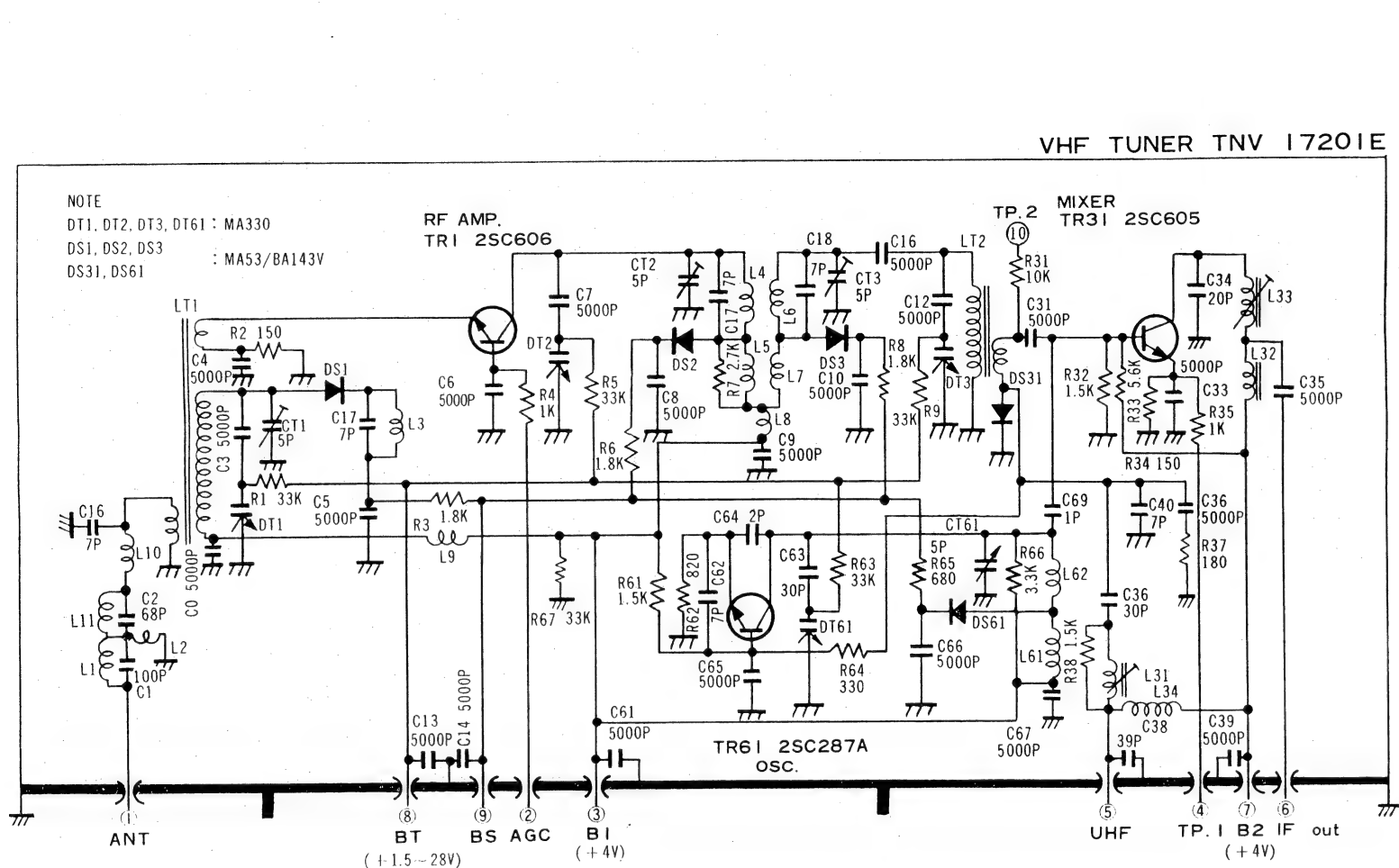
7. WAVE FORMS







SCHEMATIC DIAGRAM OF MODEL TR-001EU



- NOTE: 1. RESISTANCE VALUES ARE SHOWN IN OHMS:  
K=1000. M=1,000,000.
2. CAPACITANCE VALUES ARE SHOWN IN  $\mu F=10^{-6} F$   
OTHERWISE NOTED P= $\mu F=10^{-12} F$ .
3. COIL RESISTANCE VALUES LESS THAN 1 OHM  
ARE NOT SHOWN.
4. DC VOLTAGES ARE READ WITH VACUUM TUBE  
VOLT METER AND ALL CONTROLS SET FOR  
NORMAL PICTURE.

5. ALL WAVEFORMS ARE PEAK TO PEAK VOLTAGES  
WHEN VIDEO INPUT ① IS SET TO 0.25p-p AND  
CONTRAST, BRIGHTNESS CONTROLS ARE SET FOR  
MAXIMUM.
6. MARKS -O-O- INDICATE JUNCTION POINT FOR  
TERMINAL OF THE CIRCUIT BOARDS.
7. THE NUMBER ①, ②, ... SHOWN ON SCHEMATIC  
DIAGRAM INDICATE POINTS OF OBSERVATION  
OF THE WAVEFORMS.

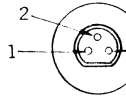
FROM MODEL TY-196E  
or TY-197E

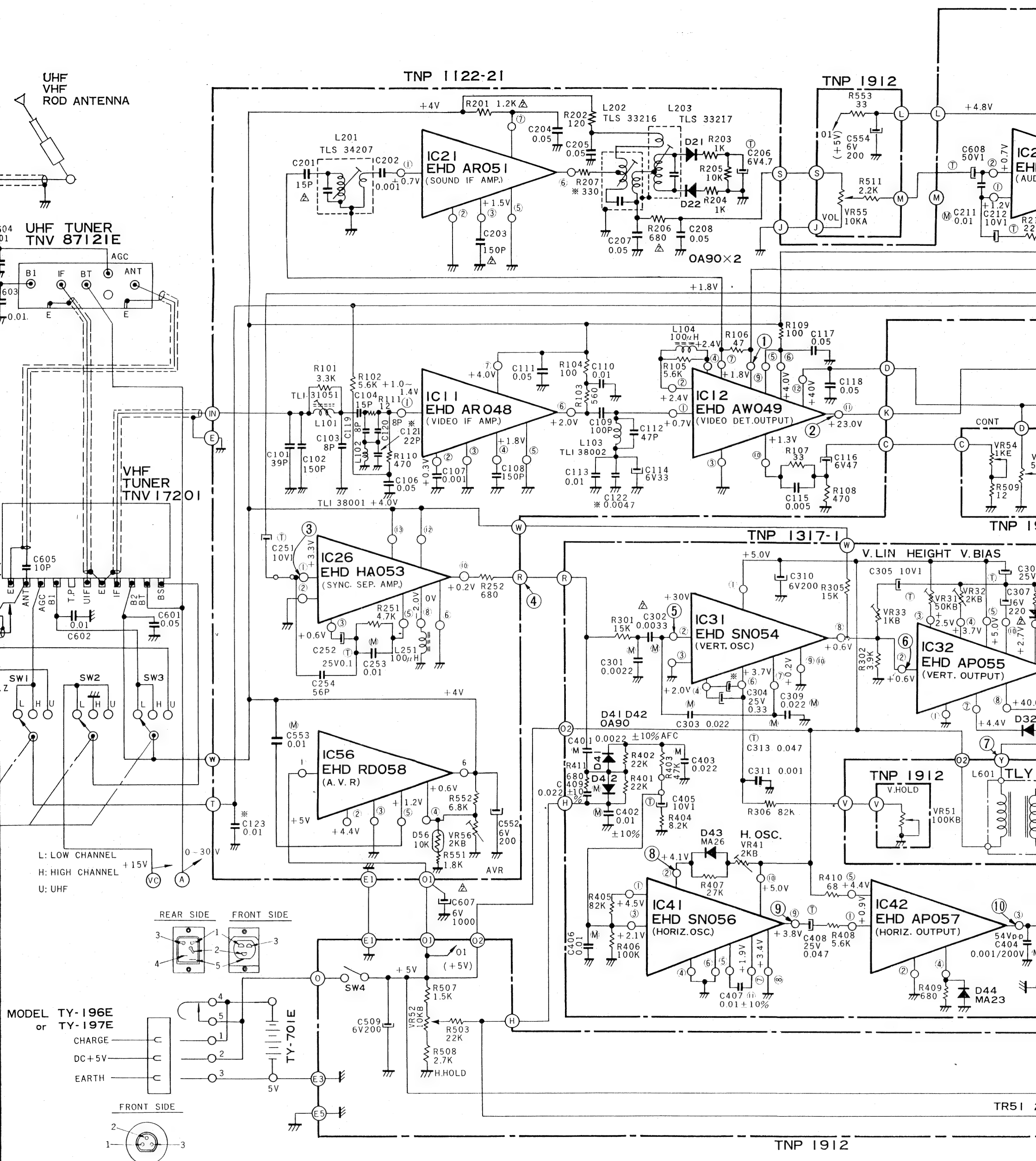
CHARGE

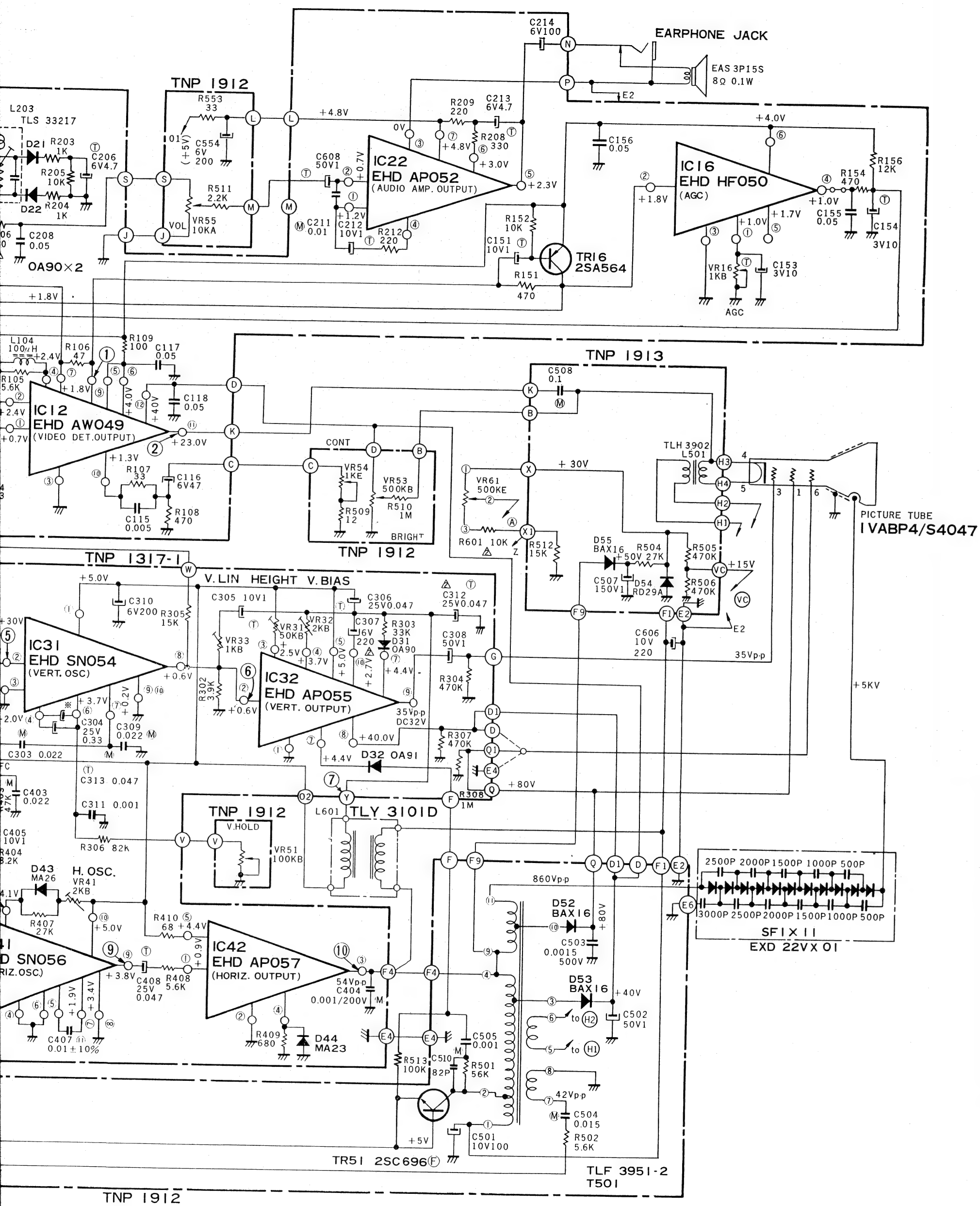
DC+5V

EARTH

FRONT S









## 9. CIRCUIT BOARDS OF MODEL TR-001EU

VIDEO & SOUND IF PRINTED CIRCUIT BOARD (TNP 1122-21)

CONDUCTOR VIEW

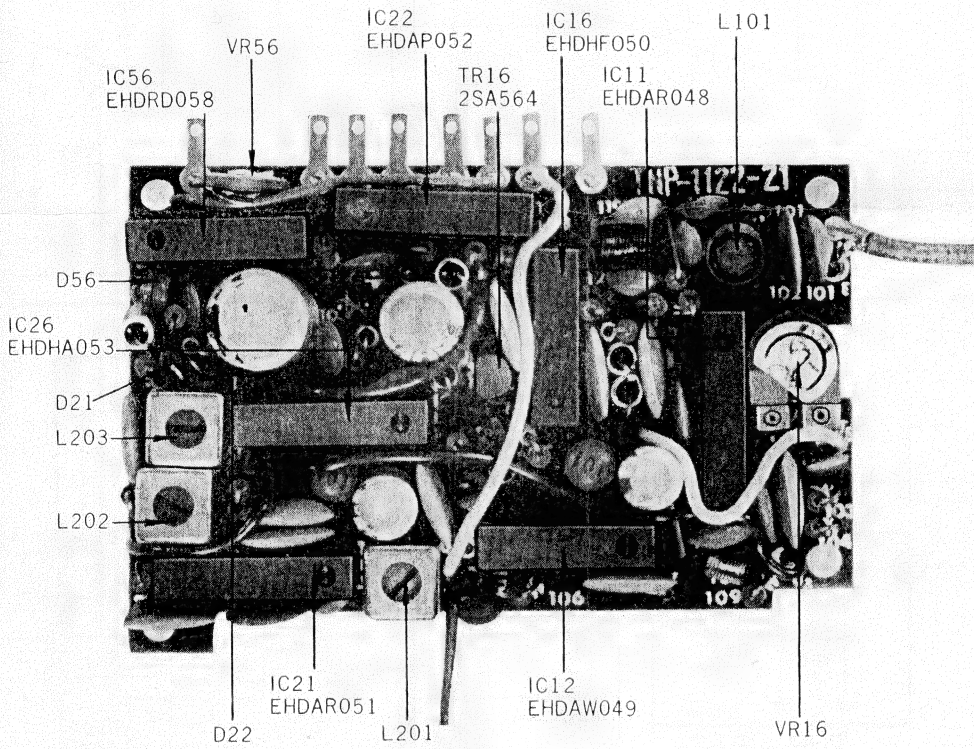


Fig. 9-1

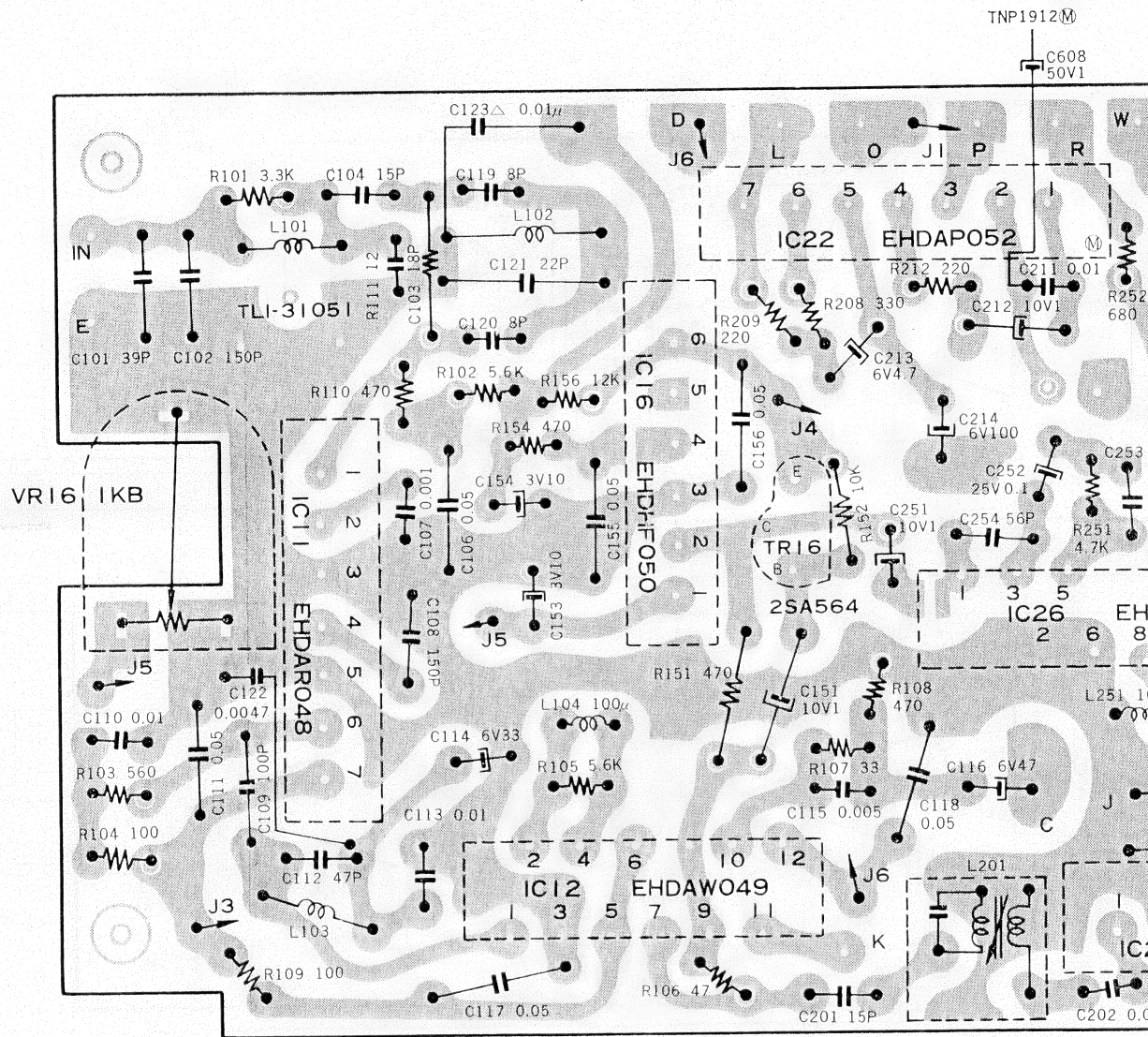


Fig. 9-2

OTHER PRINTED CIRCUIT BOARDS (TNP 1913)

CONDUCTOR VIEW

### COMPONENT VIEW

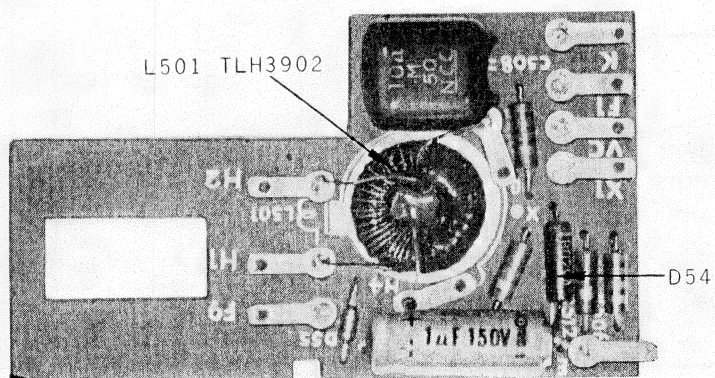


Fig. 9-5

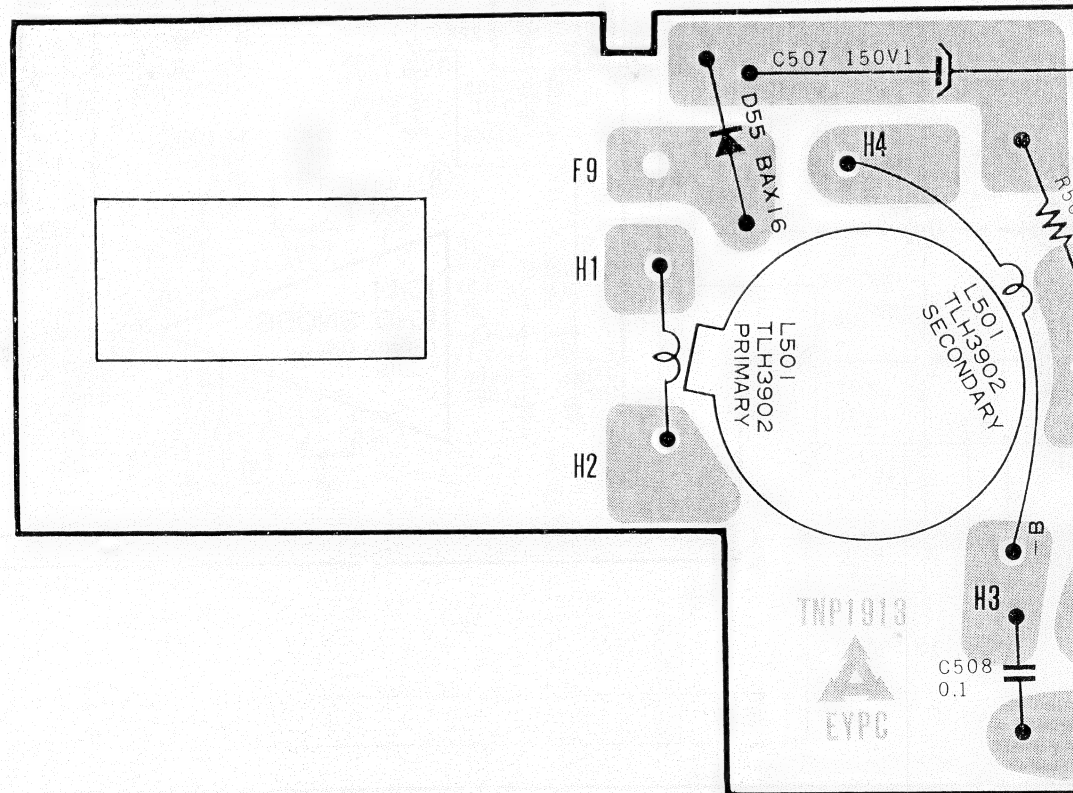


Fig. 9-6



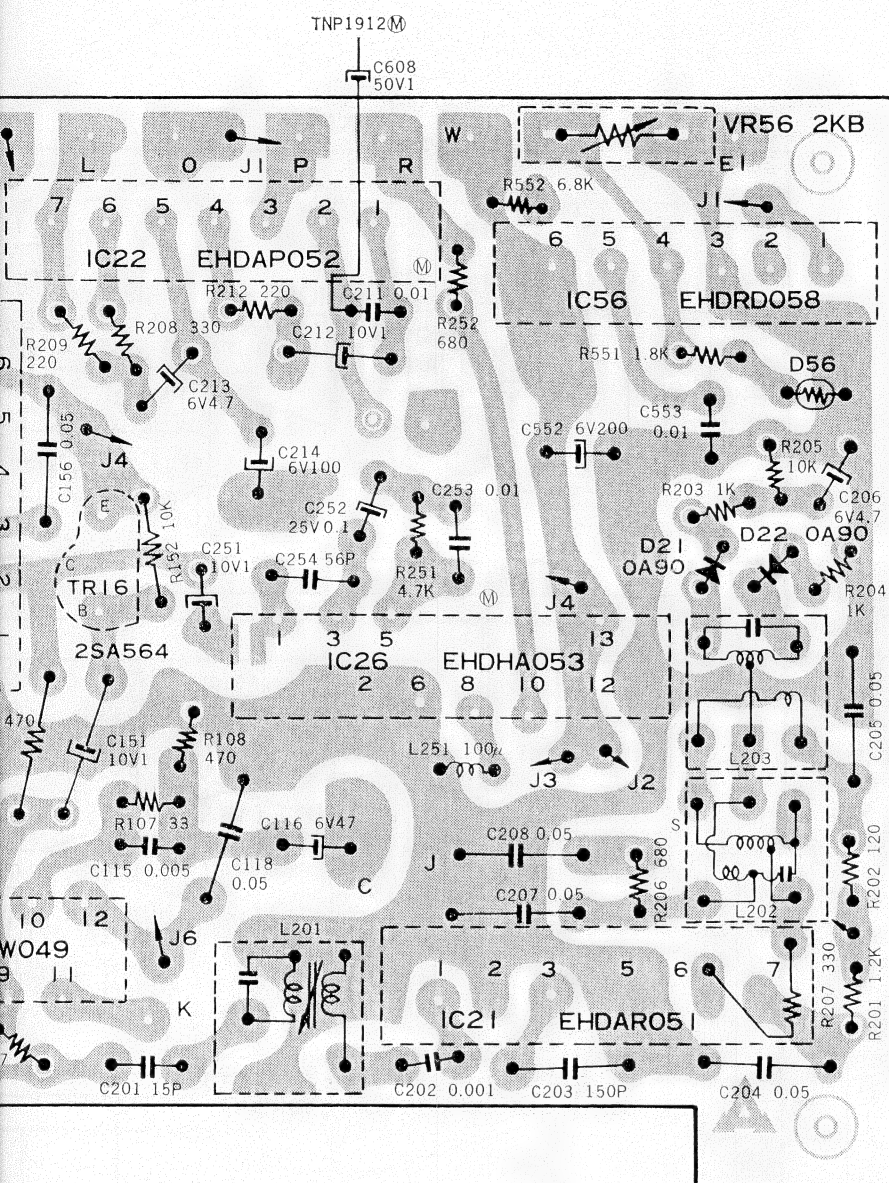


Fig. 9-2

### COMPONENT VIEW

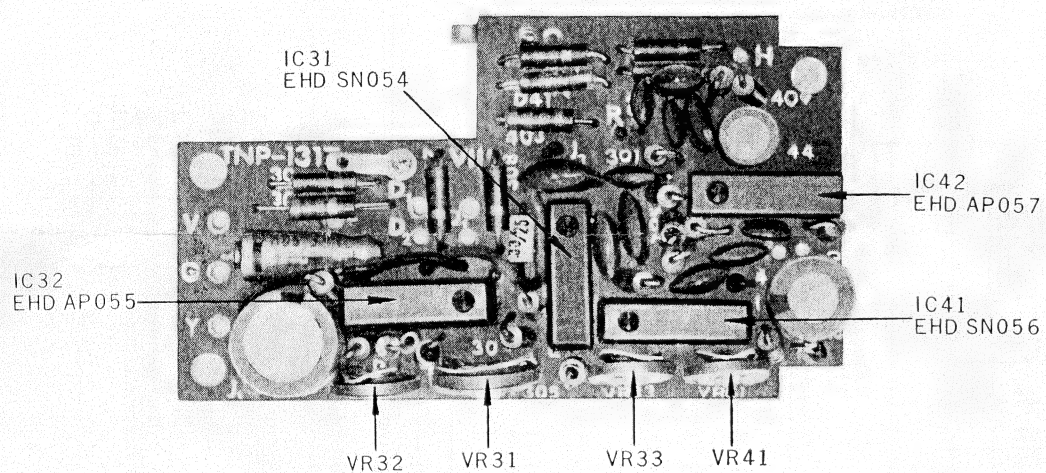
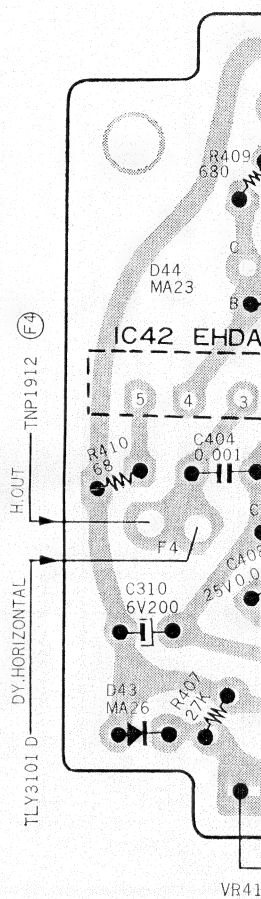


Fig. 9-3



(TNP 1912)

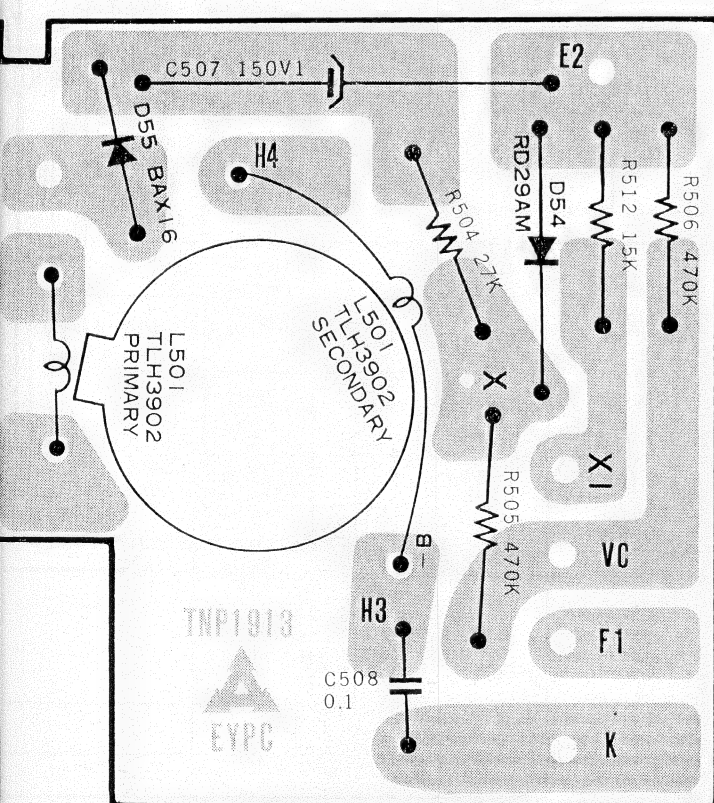
BLACK TNP1317-1 (E4)

RED 3P JACK ⑤

YELLOW TNP 1122.21(S)

BLUE TNP1122-21 10V. C210

CTOR VIEW



### COMPONENT VIEW

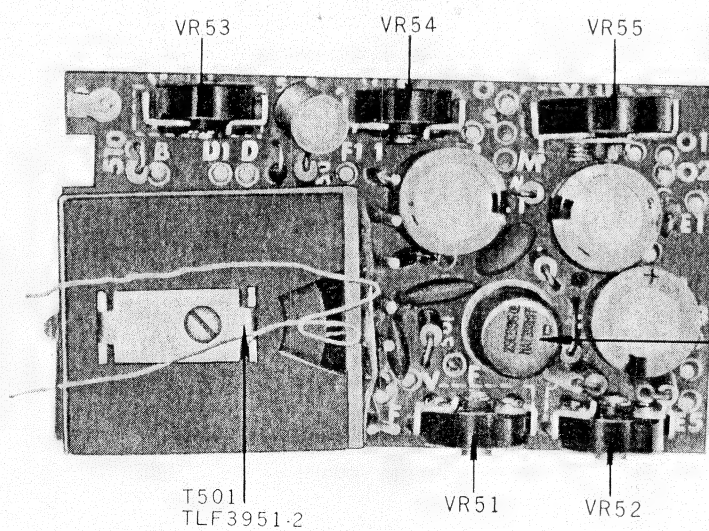
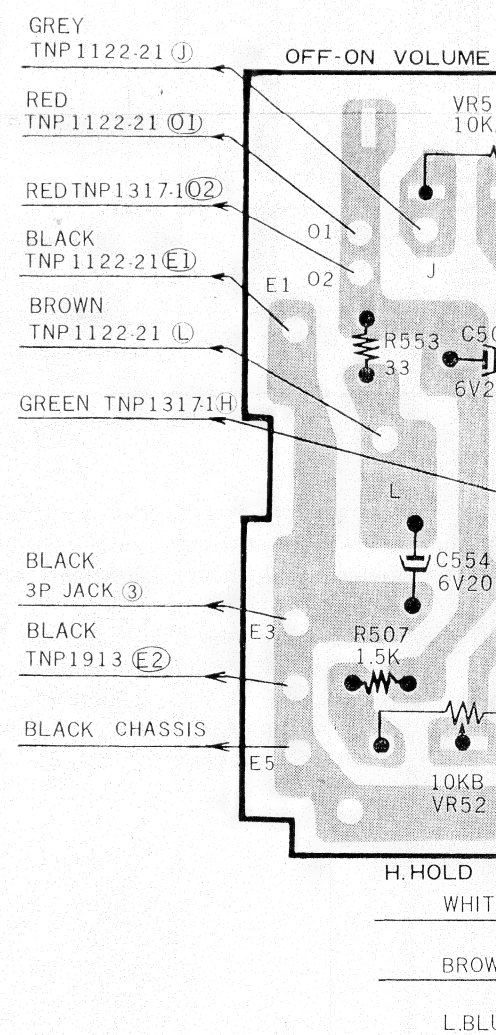
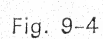


Fig. 9-7

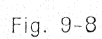




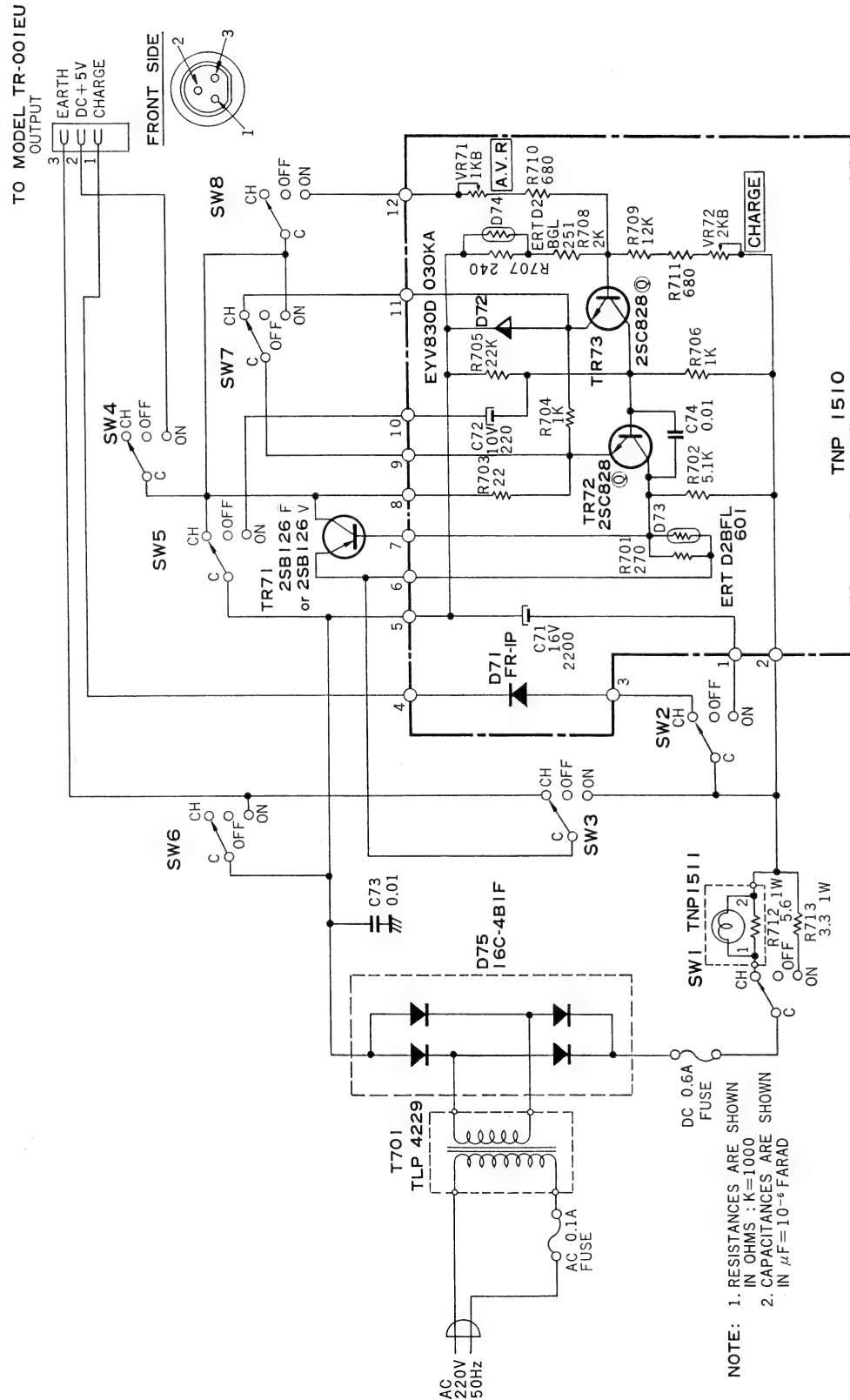
CONDUCTOR VIEW



CONDUCTOR VIEW



# SCHEMATIC DIAGRAM MODEL TY-196E





# CIRCUIT BOARDS OF MODEL TY-196E

## COMPONENT VIEW

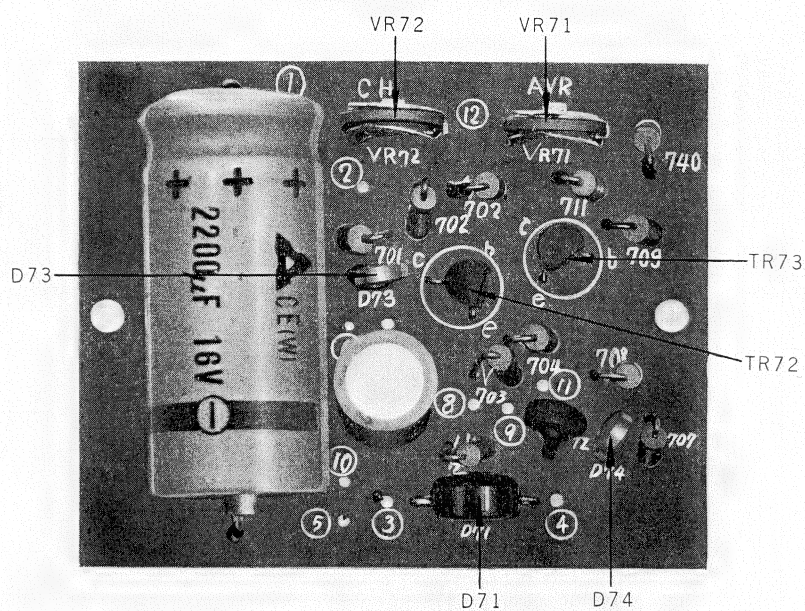


Fig. 9-9  
TNP 1510

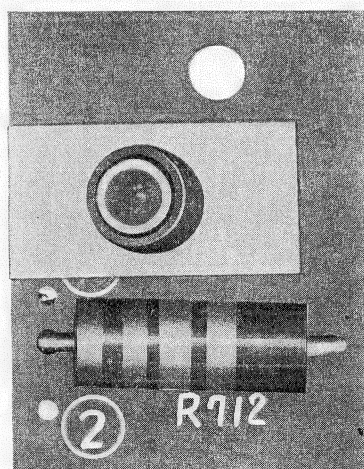


Fig. 9-10  
TNP 1511



# CONDUCTOR VIEW

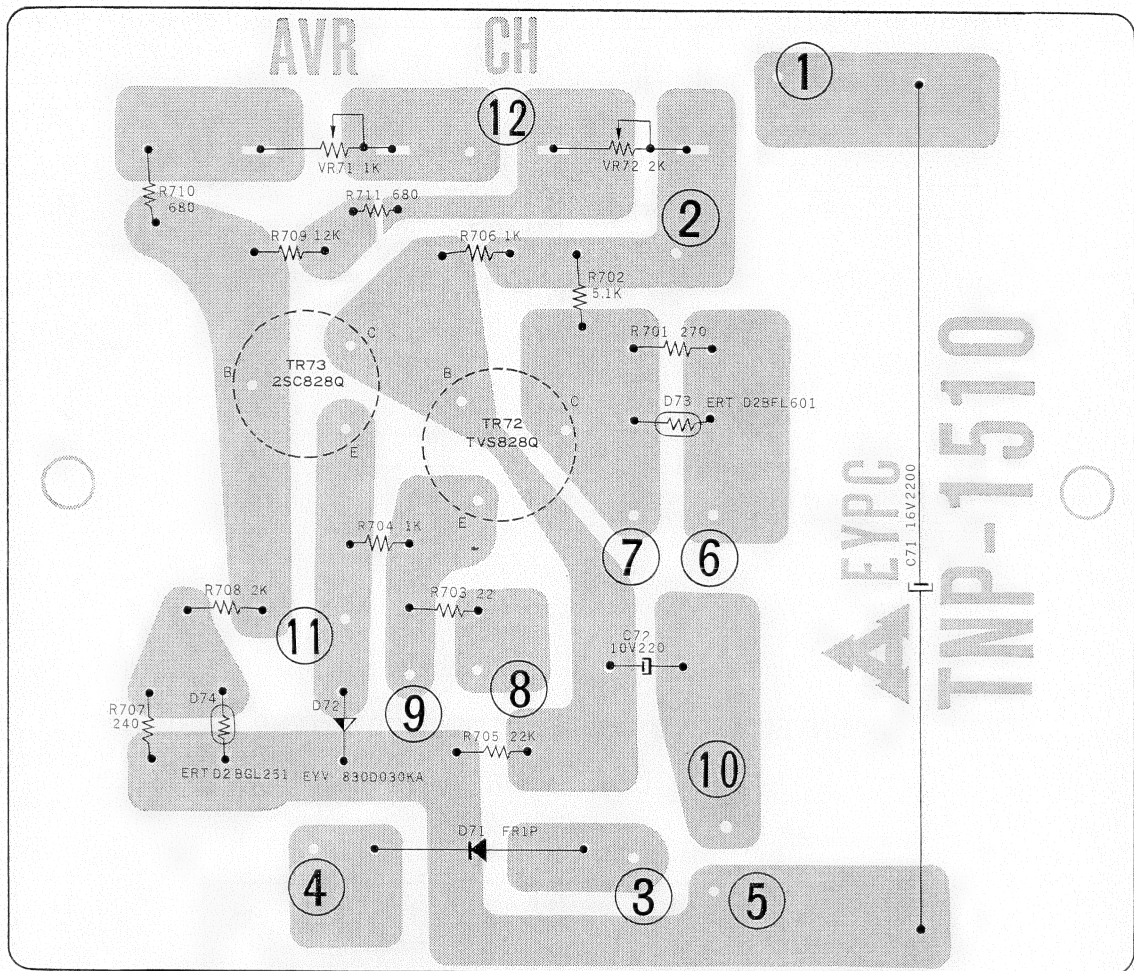


Fig. 9-11

AVR & AOCB PRINTED CIRCUIT BOARD (TNP 1510)

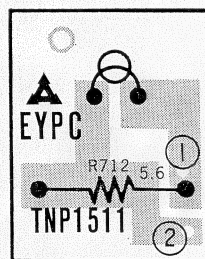
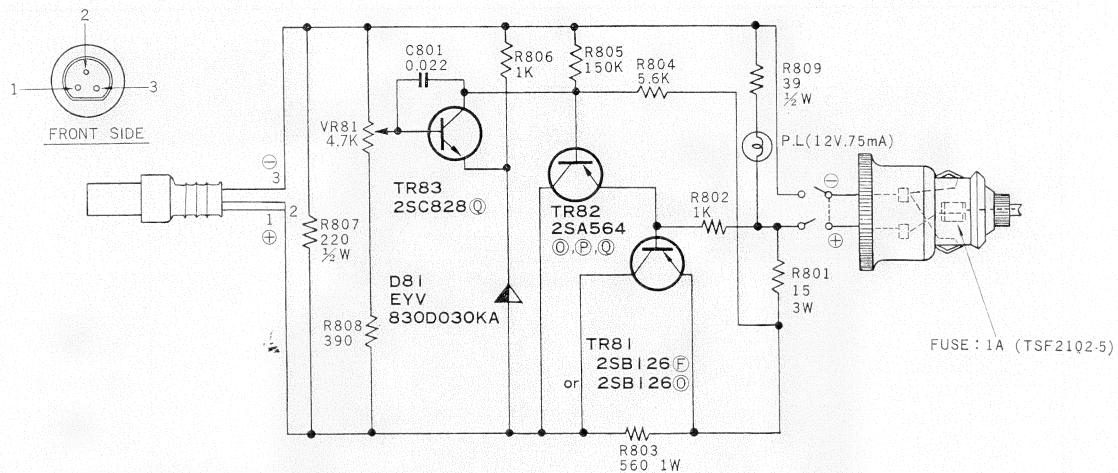


Fig. 9-12

PILOT LAMP PRINTED CIRCUIT BOARD (TNP 1511)

CONDUCTOR VIEW

## SCHEMATIC DIAGRAM OF MODEL TY-197E



NOTE: 1. RESISTANCES ARE SHOWN IN OHMS : K=1000  
2. CAPACITANCES ARE SHOWN IN  $\mu F$  ( $10^{-6}$  FARAD)  
OTHERWISE NOTED : P=  $10^{-12}$  FARAD

PRINTED CIRCUIT BOARD OF TY197E (TNP 1513)

CONDUTOR VIEW

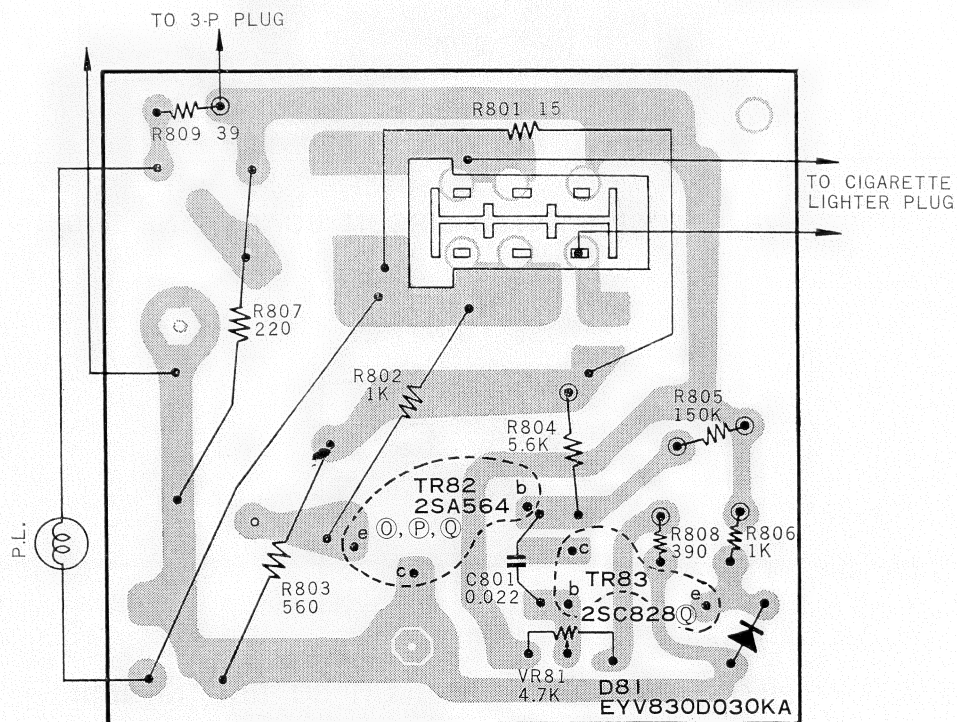


Fig. 9-13

## 10. REPLACEMENT PARTS LIST

SYMBOL	PART NO.	DESCRIPTION	SYMBOL	PART NO.	DESCRIPTION
RESISTORS					
R 101	ERC 16GK332	Solid, 3.3K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	R 507	ERC 16GK152	Solid, 1.5K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W
R 102	ERC 16GK562	Solid, 5.6K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	R 508	ERC 16GK272	Solid, 2.7K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W
R 103	ERC 16GK561	Solid, 560 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	R 509	ERC 16GK120	Solid, 12 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W
R 104	ERC 16GK101	Solid, 100 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	R 510	ERC 16GK105	Solid, 1M $\Omega$ $\pm$ 10% $\frac{1}{4}$ W
R 105	ERC 16GK562	Solid, 5.6K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	R 511	ERC 16GK222	Solid, 22K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W
R 106	ERC 16GK470	Solid, 47 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	R 512	ERC 16GK153	Solid, 15K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W
R 107	ERC 16GK330	Solid, 33 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	R 513	ERC 16GK104	Solid, 100K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W
R 108	ERC 16GK471	Solid, 470 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	R 551	ERC 16GK182	Solid, 1.8K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W
R 109	ERC 16GK101	Solid, 100 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	R 552	ERC 16GK682	Solid, 6.8K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W
R 110	ERC 16GK471	Solid, 470 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	R 553	ERC 16GK330	Solid, 33 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W
R 111	ERC 16GK120	Solid, 12 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	R 601	ERC 12GJ 103	Solid, 10K $\Omega$ $\pm$ 5% $\frac{1}{2}$ W
R 151	ERC 16GK471	Solid, 470 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	VARIABLE RESISTORS		
R 152	ERC 16GK103	Solid, 10K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	VR 16	TVZ S3AA00B13M	1K $\Omega$ , AGC Control
R 154	ERC 16GK471	Solid, 470 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	VR 31	EVL TOAA00B54	50K $\Omega$ , Vert. Height
R 156	ERC 16GK123	Solid, 12K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	VR 32	TVZ TOAA00B23M	2K $\Omega$ , Vert. Bias
R 201	ERC 16GK122	Solid, 1.2K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	VR 33	TVZ TOAA00B13M	1K $\Omega$ , Vert. Linearity
R 202	ERC 16GK121	Solid, 120 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	VR 41	TVZ TOAA00B23M	2K $\Omega$ , Horiz. Osc.
R 203	ERC 16GK102	Solid, 1K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	VR 51	EVL 10AT10B15	100K $\Omega$ , Vert. Hold
R 204	ERC 16GK102	Solid, 1K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	VR 52	EVL 10AT10B14	10K $\Omega$ , Horiz. Hold
R 205	ERC 16GK103	Solid, 10K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	VR 53	EVL 10AT10B55	500K $\Omega$ , Brightness
R 206	ERC 16GK681	Solid, 680 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	VR 54	EVL 08AT10E13	1K $\Omega$ , Contrast
R 207	ERC 16GK 331	Solid, 330 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	VR 55	EVL 52BT12A14	10K $\Omega$ , Off-Volume
R 208	ERC 16GK331	Solid, 330 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	VR 56	TVZ TOAA00B23M	2K $\Omega$ , AVR Control
R 209	ERC 16GK221	Solid, 220 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	CAPACITORS		
R 212	ERC 16GK221	Solid, 220 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 101	ECC D05390K	Ceramic, 39pF $\pm$ 10% 50V
R 251	ERC 16GK472	Solid, 4.7K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 102	ECC D05151K	Ceramic, 150pF $\pm$ 10% 50V
R 252	ERC 16GK681	Solid, 680K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 103	ECC D05180K	Ceramic, 18pF $\pm$ 10% 50V
R 301	ERC 16GK153	Solid, 15K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 104	ECC D05150F	Ceramic, 15pF $\pm$ 10% 50V
R 302	ERC 16GK392	Solid, 3.9K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 106	TCK S05503ZM	Ceramic, 0.05 $\mu$ F $\pm$ 20% 50V
R 303	ERC 16GK333	Solid, 33K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 107	TCK S05102PM	Ceramic, 0.001 $\mu$ F $\pm$ 20% 50V
R 304	ERC 16GK474	Solid, 470K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 108	ECC D05151K	Ceramic, 150pF $\pm$ 10% 50V
R 305	ERC 16GK153	Solid, 15K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 109	ECC D05101K	Ceramic, 100pF $\pm$ 10% 50V
R 306	ERC 16GK823	Solid, 82K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 110	TCK S05103ZM	Ceramic, 0.01 $\mu$ F $\pm$ 20% 50V
R 307	ERC 16GK474	Solid, 470K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 111	TCK S05503ZM	Ceramic, 0.05 $\mu$ F $\pm$ 20% 50V
R 308	ERC 16GK105	Solid, 1M $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 112	ECC D05470K	Ceramic, 47pF $\pm$ 10% 50V
R 401	ERC 16GK223	Solid, 22K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 113	TCK S05103ZM	Ceramic, 0.01 $\mu$ F $\pm$ 20% 50V
R 402	ERC 16GK223	Solid, 22K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 114	ECE A6V33N	Electrolytic, 33 $\mu$ F 6V
R 403	ERC 16GK473	Solid, 47K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 115	TCK S05502ZM	Ceramic, 0.005 $\mu$ F $\pm$ 20% 50V
R 404	ERC 16GK822	Solid, 8.2K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 116	ECE A6V47T	Electrolytic, 47 $\mu$ F 6V
R 405	ERC 16GK823	Solid, 82K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 117	TCK S05503ZM	Ceramic, 0.05 $\mu$ F $\pm$ 20% 50V
R 406	ERC 16GK104	Solid, 100K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 118	TCK S05503ZM	Ceramic, 0.05 $\mu$ F $\pm$ 20% 50V
R 407	ERC 16GK273	Solid, 27K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 119	ECC D05080D	Ceramic, 8pF $\pm$ 0.5pF 50V
R 408	ERC 16GK562	Solid, 5.6K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 120	ECC D05080D	Ceramic, 8pF $\pm$ 0.5pF 50V
R 409	ERC 16GK681	Solid, 680 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 121	ECC D05220K	Ceramic, 22pF $\pm$ 10% 50V
R 410	ERC 16GK680	Solid, 68 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 122	ECC D05472PJ	Ceramic, 0.0047 $\mu$ F $\pm$ 10% 50V
R 411	ERC 16GK681	Solid, 680 $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 123	TCK S05103ZM	Ceramic, 0.01 $\mu$ F $\pm$ 20% 50V
R 501	ERC 16GK563	Solid, 56K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W	C 151	ECS Z10EA1	Solid, Tantalum Electrolytic 1 $\mu$ F 10V
R 502	ERC 16GK562	Solid, 5.6K $\pm$ 10% $\frac{1}{4}$ W	C 153	ECS Z3EA10	Solid, Tantalum Electrolytic 10 $\mu$ F 3V
R 503	ERC 16GK223	Solid, 22K $\pm$ 10% $\frac{1}{4}$ W	C 154	ECS Z3EA10	Solid, Tantalum Electrolytic 10 $\mu$ F 3V
R 504	ERC 16GK273	Solid, 27K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W			
R 505	ERC 16GK474	Solid, 470K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W			
R 506	ERC 16GK474	Solid, 470K $\Omega$ $\pm$ 10% $\frac{1}{4}$ W			



SYMBOL	PART NO.	DESCRIPTION	SYMBOL	PART NO.	DESCRIPTION
C 155	TCK S05503ZM	Ceramic, 0.05 $\mu$ F $\pm 20\%$ 50V	C 409	TCQ M05222KZN	Polyester Film, 0.0022 $\mu$ F $\pm 10\%$ 50V
C 156	TCK S05503ZM	Ceramic, 0.05F $\mu$ $\pm 20\%$ 50V	C 501	ECE A10V100N	Electrolytic, 100 $\mu$ F 10V
C 201	ECC D05150K	Ceramic, 150pF $\pm 10\%$ 50V	C 502	ECE A50V1N	Electrolytic, 1 $\mu$ F 50V
C 202	TCK S05102PM	Ceramic, 0.001 $\mu$ F $\pm 20\%$ 50V	C 503	TCK D5152PM	Ceramic, 1500pF $\pm 10\%$ 500V
C 203	ECC S05151K	Ceramic, 150pF $\pm 10\%$ 50V	C 504	TCQ M05153MZN	Polyester Film, 0.015 $\mu$ F $\pm 20\%$ 50V
C 204	TCC S05503ZM	Ceramic, 0.05 $\mu$ F $\pm 20\%$ 50V	C 505	TCQ M05102MZN	Polyester Film, 0.001 $\mu$ F $\pm 20\%$ 50V
C 205	TCK S05503ZM	Ceramic, 0.05 $\mu$ F $\pm 20\%$ 50V	C 507	ECE B150V1	Electrolytic, 1 $\mu$ F 150V
C 206	ECS Z6EA4R7	Ceramic, 4.7 $\mu$ F 6V	C 508	TCQ M05104MZN	Polyester Film, 0.1 $\mu$ F $\pm 20\%$ 50V
C 207	TCK S05503ZM	Ceramic, 0.05 $\mu$ F $\pm 20\%$ 50V	C 509	ECE A6V200T	Electrolytic, 200 $\mu$ F 6V
C 208	TCK S05503ZM	Ceramic, 0.05 $\mu$ F $\pm 20\%$ 50V	C 510	ECC D05820K	Ceramic, 82pF $\pm 10\%$ 50V
C 210	ECS Z10EA1	Solid, Tantalum Electrolytic, 1 $\mu$ F 10V	C 552	ECE A6V200T	Electrolytic, 200 $\mu$ F 6V
C 211	TCQ M05103MZN	Polyester Film, 0.01 $\mu$ F $\pm 20\%$ 50V	C 553	TCQ M05103MZN	Polyester Film, 0.01 $\mu$ F $\pm 20\%$ 50V
C 212	ECS Z10EA1	Solid, Tantalum Electrolytic, 1 $\mu$ F 10V	C 601	TCK S05503ZM	Ceramic, 0.05 $\mu$ F $\pm 20\%$ 50V
C 213	ECS Z6EA4R7	Solid, Tantalum Electrolytic, 4.7 $\mu$ F 6V	C 602	TCK S05103ZM	Ceramic, 0.01 $\mu$ F $\pm 20\%$ 50V
C 214	ECE A6V100N	Electrolytic 100 $\mu$ F 6V	C 603	TCK S05103ZM	Ceramic, 0.01 $\mu$ F $\pm 20\%$ 50V
C 251	ECS Z10EA1	Solid, Tantalum Electrolytic, 1 $\mu$ F 10V	C 604	TCK S05103ZM	Ceramic, 0.01 $\mu$ F $\pm 20\%$ 50V
C 252	ECS Z25EA0R1	Solid, Tantalum Electrolytic, 0.1 $\mu$ F 25V	C 605	ECC D05100F	Ceramic, 10pF $\pm 1p$ F 50V
C 253	TCQ M05103MZN	Polyester Film, 0.01 $\mu$ F $\pm 20\%$ 50V	C 606	ECE A10V220N	Electrolytic, 220 $\mu$ F 10V
C 254	ECC D05560K	Ceramic, 56pF $\pm 10\%$ 50V	C 607	ECE A6V1000Y	Electrolytic, 1MF 6V
C 301	TCQ M05222KZN	Polyester Film, 0.0022 $\mu$ F $\pm 10\%$ 50V	C 608	ECE A50V1NC	Electrolytic, 1 $\mu$ F 50V
C 302	TCQ M05332KZN	Polyester Film, 0.0033 $\mu$ F $\pm 10\%$ 50V	COILS & TRANSFORMERS		
C 303	TCQ M05223MZN	Polyester Film, 0.022 $\mu$ F $\pm 20\%$ 50V	L 101	TLI 31051	VIF Input Coil
C 304	ECS Z25EA0R33	Solid Tantalum Electrolytic, 0.33 $\mu$ F 25V	L 102	TLI 38001	VIF Trap Coil
C 305	ECS Z10EA1	Solid Tantalum Electrolytic, 1 $\mu$ F 10V	L 103	TLI 38002	VIF Output Coil
C 306	ECS Z25EAR047	Solid Tantalum Electrolytic, 0.047 $\mu$ F 25V	L 104	TLU 101016	100 $\mu$ H
C 307	ECE A6V200N	Electrolytic, 200 $\mu$ F 6V	L 201	TLS 34207	SIF Input Coil
C 308	ECE B50V1N	Electrolytic, 1 $\mu$ F 50V	L 202	TLS 33216	Discriminator Coil
C 309	TCQ M05223MZN	Polyester Film, 0.022 $\mu$ F $\pm 20\%$ 50V	L 203	TLS 33217	Discriminator Coil
C 310	ECE A6V200Y	Electrolytic, 200 $\mu$ F 6V	L 251	TLU 101016	100 $\mu$ H
C 311	ECK D05102MY	Ceramic, 0.001 $\mu$ F 50V	L 501	TLH 3902	Heater Transformer
C 312	ECS Z25EAR047	Electrolytic, 0.047 $\mu$ F 25V	L 601	TLY 3101D	Deflection Yoke
C 313	ECS Z25EAR047	Electrolytic, 0.047 $\mu$ F 25V	T 501	TLF 3951-2	Flyback Transformer
C 401	TCQ M05222KZN	Polyester Film, 0.0022 $\mu$ F $\pm 10\%$ 50V	IC		
C 402	TCQ M05103KZN	Polyester Film, 0.01 $\mu$ F $\pm 10\%$ 50V	IC 11	EHD AR048	Video IF Amp.
C 403	TCQ M05223MZN	Polyester Film, 0.022 $\mu$ F $\pm 20\%$ 50V	IC 12	EHD AW049	Video Output
C 404	TCQ M2102MZN	Polyester Film, 0.001 $\mu$ F $\pm 20\%$ 200V	IC 16	EHD HF050	AGC
C 405	ECS Z10EA1	Solid Tantalum Electrolytic, 1 $\mu$ F 10V	IC 21	EHD AR051	Sound IF Amp.
C 406	TCQ M05103MZN	Polyester Film, 0.01 $\mu$ F $\pm 20\%$ 50V	IC 22	EHD AP052	Audio Amp. Output
C 407	TCQ M05103KZN	Polyester Film, 0.01 $\mu$ F $\pm 10\%$ 50V	IC 26	EHD HA053	Sync. Sep. Amp.
C 408	ECS Z25EAR047	Solid Tantalum Electrolytic, 0.047 $\mu$ F 25V	IC 31	EHD SN054	Vert. Osc.
			IC 32	EHD AP055	Vert. Output
			IC 41	EHD SN056	Horiz. Osc.
			IC 42	EHD AP057	Horiz. Output
			IC 56	EHD RD058	AVR

SYMBOL	PART NO.	DESCRIPTION	SYMBOL	PART NO.	DESCRIPTION
TRANSISTORS & DIODES			MISCELLANEOUS		
TR 16	TVS 2SA564	Noise Cancellor			TV
TR 51	TVS 2SC696®	Boost	TKY 34301-3		Cabinet Body (A)
D 21	TVS 0A90	Ge. Diode	TKY 34401-3		Cabinet Body (B)
D 22	TVS 0A90	Ge. Diode	TKE 34201-1		Escutcheon
D 31	TVS 0A90	Ge. Diode	TKK 30902		Battery Compartment Cover
D 32	TVS 0A91	Ge. Diode	TKK 30903		Front Hood with Lens
D 41	TVS 0A90	Horiz. AFC	TKK 30550		Carry Band
D 42	TVS 0A90	Horiz. AFC	TKG 30627		Front Glass
D 43	TVS MA26	Horiz. Osc.	TSE 326		Slide Switch : VHF-UHF Channel Selector
D 44	TVS MA23	Horiz. Damp	TBX 3617		Knob : VHF-UHF Tuning
D 52	TVS BAX16		TBX 3626		Knob : Off-Volume
D 53	TVS BAX16		TBX 3618		Knob : Contrast
D 54	TVS RD29AM		TBX 3618		Knob : Brightness
D 55	TVS BAX16		TBX 3618		Knob : Vert. Hold
D 56	ERT D2FGL103S	Thermistor	TBX 3618		Knob : Horiz. Hold
			IVABP4/S4047		Picture Tube
			TES 3201		Spring (for mounting picture tube)
			TNV 17201E		VHF Tuner
			TNV 87121E		UHF Tuner
			EAS 3P15S		Speaker
			TSA 140-1		VHF/UHF Rod Antenna
			TNP 1122-21		Video & Sound IF P. C. Board
			TNP 1317-1		Deflection P. C. Board
			TNP 1912		Other Printed Circuit Board
			TNP 1913		Other Printed Circuit Board
			TJS 28680		3-p Power Socket
			TJS 25631		Picture Tube Socket
			TJS 28700		External Antenna Socket
			TJS 28700		Earphone Socket
			THE 296-5		Battery Compartment Screw
			TY-701E		NATIONAL Nickel Cadmium Battery Pack
			TNQ 311		Matching Unit
			TY-196E		AC Adaptor Complete

## REPLACEMENT PARTS LIST OF AC ADAPTOR (TY-196E)

SYMBOL	PART NO.	DESCRIPTION	SYMBOL	PART NO.	DESCRIPTION
RESISTORS			TRANSFORMER, TRANSISTORS & DIODES		
R 701	ERD 14TJ271	Carbon, 270 $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	T 701	TLP 4229	Power Transformer
R 702	ERD 14TJ512	Carbon, 5.1K $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	TR 71	TVS 2SB126 $\text{\textcircled{P}}$ or $\text{\textcircled{V}}$	
R 703	ERD 14TJ220	Carbon, 22 $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	TR 72	TVS 2SC828 $\text{\textcircled{Q}}$	
R 704	ERD 14TJ102	Carbon, 1K $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	TR 73	TVS 2SC828 $\text{\textcircled{Q}}$	
R 705	ERD 14TJ223	Carbon, 22K $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	D 71	TVS FR1P	
R 706	ERD 14TJ102	Carbon, 1K $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	D 72	EYV 830D030KA	3V Varia
R 707	ERD 14TJ241	Carbon, 240 $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	D 73	ERT D2BFL602	Thermistor
R 708	ERD 14TJ202	Carbon, 2K $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	D 74	ERT D2BGL251	
R 709	ERD 14TJ123	Carbon, 12K $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	D 75	TVM 16C-4B1F	Selenium Rectifier
R 710	ERD 14TJ681	Carbon, 680 $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	MISCELLANEOUS		
R 711	ERD 14TJ681	Carbon, 680 $\Omega$ $\pm$ 5% $\frac{1}{4}$ W		TKK 39910S	AC Adaptor Cabinet (A)
R 712	ERC 1GJ5R6	Solid, 5.6 $\Omega$ $\pm$ 5% 1W		TKK 39909	AC Adaptor Cabinet (B)
R 713	ERC 1GJ3R3	Solid, 3.3 $\Omega$ $\pm$ 5% 1W		TBX 3566	Knob: Selector Switch
CAPACITORS				TES 147	Rotary Switch
C 71	ECE B16V2200	Electrolytic, 2200 $\mu$ F 16V		TNP 1510	AVR & AOCP Printed Circuit Board
C 72	ECE A10V220N	Electrolytic, 220 $\mu$ F 10V		TNP 1511	Pilot Lamp Printed Circuit Board
C 73	ECK D05103PJ	Ceramic, 0.01 $\mu$ F $\pm$ 10% 50V		TKK 39564	Pilot Lamp Window
C 74	ECK D05103PJ	Ceramic, 0.01 $\mu$ F $\pm$ 10% 50V		TVL 324	Pilot Lamp
VARIABLE RESISTORS				TJB 3292	Fuse Holder
VR 71	EVL TOAA00B13	1K $\Omega$ , AVR Control		TSF 21601-9	Fuse DC 0.6A
VR 72	EVL TOAA00B23	2K $\Omega$ , AOCP Control		TSF 22101	Fuse AC 0.1A
				TSX 174-1	DC Cord (DC Side)
				TSX 189	AC cord (AC Side)

## REPLACEMENT PARTS LIST OF CAR BATTERY CORD (TY-197E)

SYMBOL	PART NO.	DESCRIPTION	SYMBOL	PART NO.	DESCRIPTION
RESISTORS & CAPACITOR			TRANSISTORS, DIODE & VARIABLE RESISTOR		
R 801	ERX 3PSK150	Carbon, 15 $\Omega$ 3W	TR 81	TVS 2SB126 $\text{\textcircled{P}}$ or $\text{\textcircled{V}}$	
R 802	ERD 14TJ102	Carbon, 1K $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	TR 82	TVS 2SA564 $\text{\textcircled{Q}}$ , $\text{\textcircled{P}}$ , $\text{\textcircled{Q}}$	
R 803	ERC 1GK561	Solid, 560 $\Omega$ $\pm$ 5% 1W	TR 83	TVS 2SC828 $\text{\textcircled{Q}}$	
R 804	ERD 14TJ562	Carbon, 5.6K $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	D 81	EYV 830D030KA	BARIA
R 805	ERD 14TJ154	Carbon, 150K $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	VR 81		4.7K $\Omega$
R 806	ERD 14TJ102	Carbon, 1K $\Omega$ $\pm$ 5% $\frac{1}{4}$ W	MISCELLANEOUS		
R 807	ERD 12GK221	Carbon, 220 $\Omega$ $\pm$ 5% $\frac{1}{2}$ W		TKK 30403	Case
R 808	ERD 14TJ391	Carbon, 390 $\Omega$ $\pm$ 5% $\frac{1}{4}$ W		TKK 30404	Bottom Plate
R 809	ERC 12GK390	Solid, 39 $\Omega$ $\pm$ 10% $\frac{1}{2}$ W		TSX 194	Primary Cord With Cigarette Lighter Plug
C 801	ECQ M05223MZ	Polyester Film, 0.022 $\mu$ F 5W		TSX 174-1	Secondary Cord with 3-P Plug.
				TNP1513	Printed Circuit Board
				TSF 2102-5	1A Fuse
				TVL 328	Pilot Lamp 12V, 27mA
				TKK 39579	Pilot Lamp Window
				TSE 509	Snap-Switch



## 11. LOCATION OF PARTS

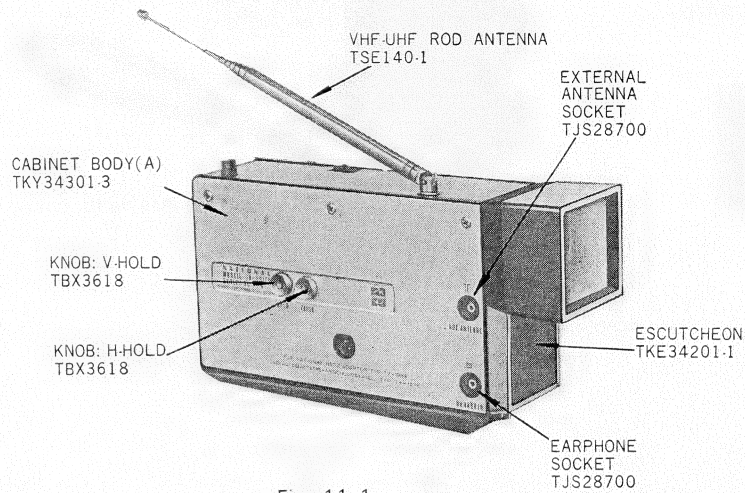


Fig. 11-1

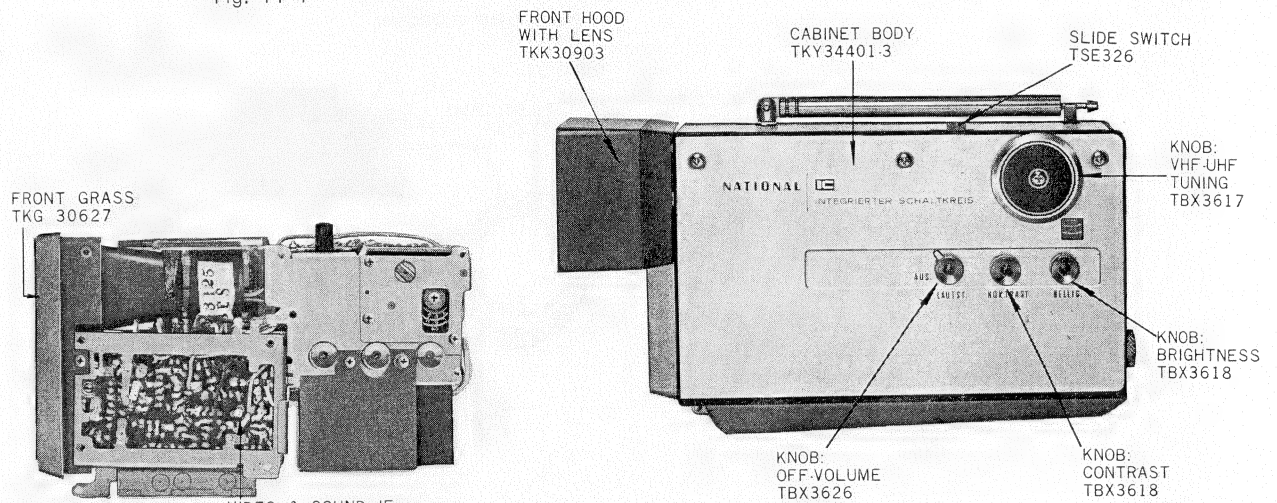


Fig. 11-2

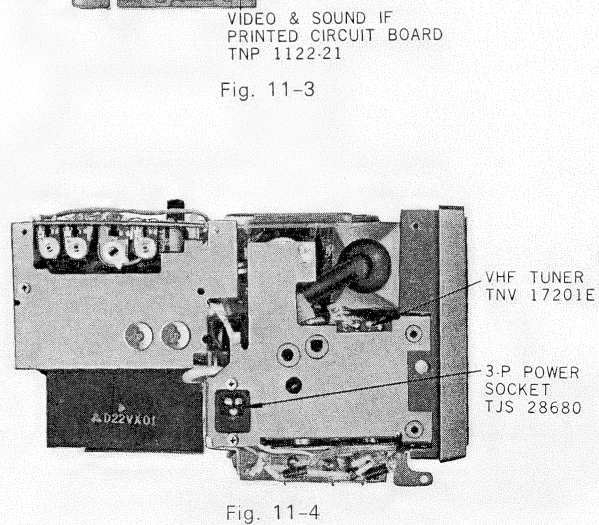


Fig. 11-3

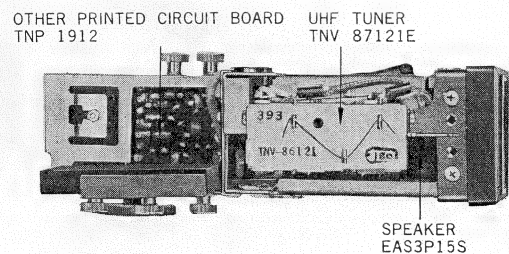


Fig. 11-4

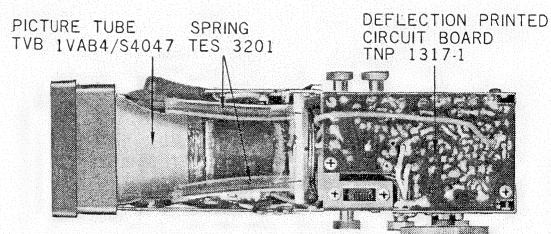


Fig. 11-6

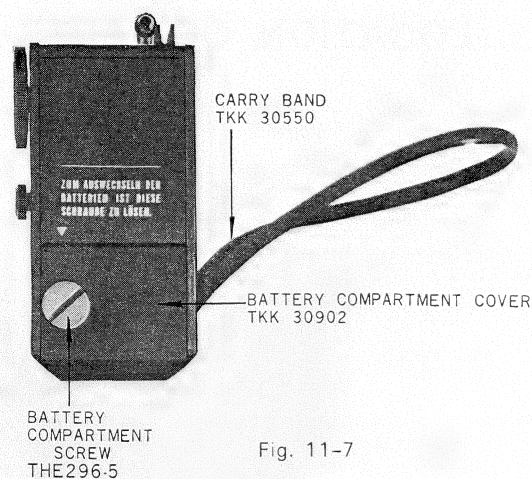


Fig. 11-7

## AC ADAPTOR TY-196E

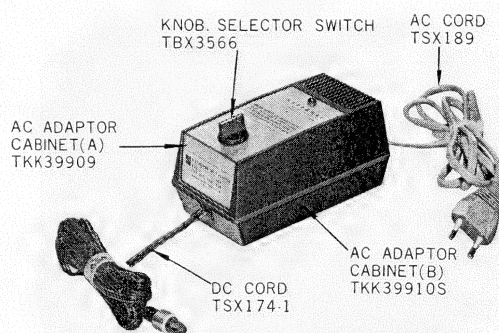


Fig. 11-8

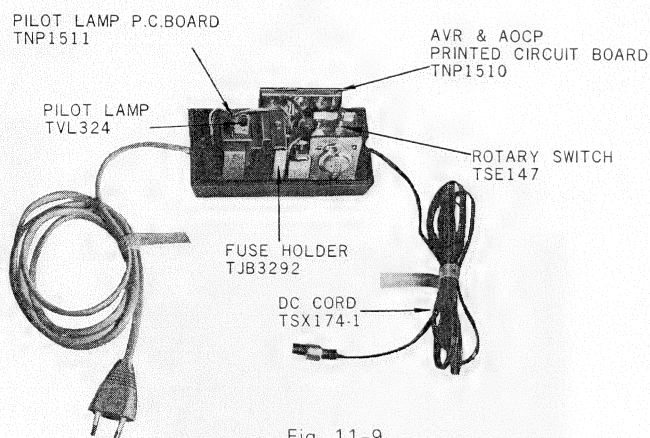


Fig. 11-9

## CAR BATTERY CORD TY-197E

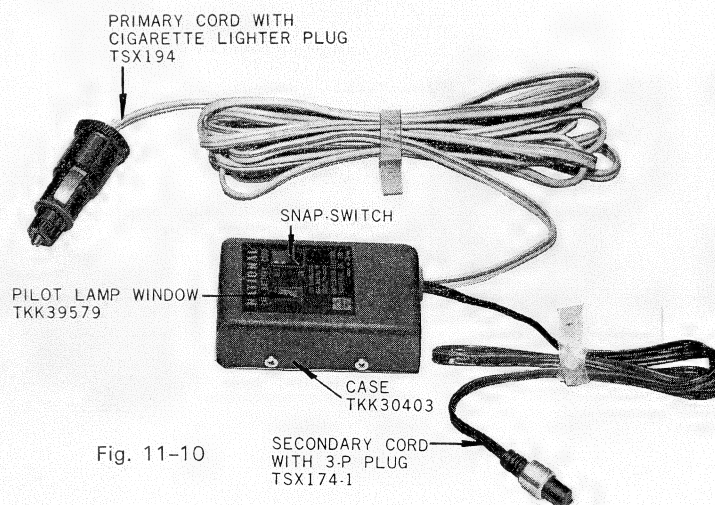


Fig. 11-10

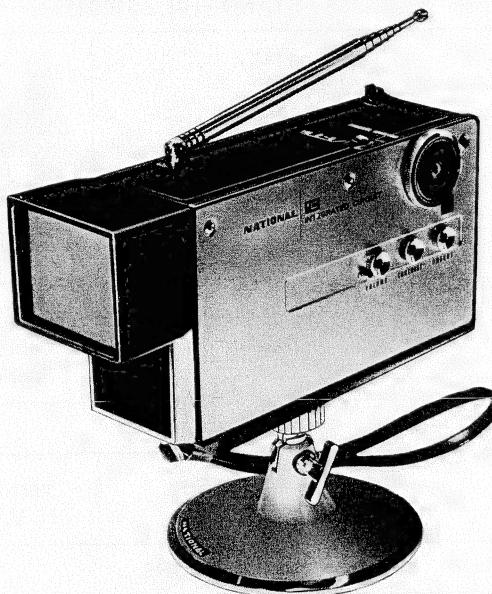


# Service Manual

**NATIONAL**  
**TELEVISION**  
**NATIONAL**



PERSONAL PORTABLE TELEVISION RECEIVER



**Supplementary**

MODEL **TR-001EU**

## SPECIFICATIONS

Power Input Rating	DC:5V, AC:200V 50Hz with AC Adaptor TY-196E, or TY-197E, or 110V, 120V, 220V, 240V 50~60Hz with AC Adaptor TY-196U	Picture Tube	1VABP4 36° deflection, aluminized 7cm <sup>2</sup> Heater Voltage 2.0V Heater Current 90mA
Power Consumption	DC:1.7W, AC:9.5W max. with AC Adaptor TY-196E, TY-197E or TY-196U	Speaker	3.8cm dynamic
Antennas	VHF and UHF Rod antenna: 75 Ohm Unbalanced VHF and UHF External antenna 75 Ohm Unbalanced	Sound Output	Max. 100mW
Channels	VHF 2-12 ch., UHF 21-69 ch., CCIR standard	Automatic Circuits	Peak AGC AVR (Automatic Voltage Regulator) AOCP (Automatic Over Charge Protector)
IF. Frequency	Video 38.9 MHz Sound 33.4 MHz	Dimensions	Automatic Noise Canceller Height: 17.5cm Width: 10cm Depth: 19cm (with front hood & set stand)
Integrated Circuits	11	Weight	1.1kg (with Battery & set stand)
Transistors	8	Battery	1 (NATIONAL Nickel Cadmium Battery Pack TY-701E)
Diodes	24		
H.V. Rectifier	1 block (11 diodes)		
Thermistor	1		

**MATSUSHITA ELECTRIC**  
MATSUSHITA ELECTRIC TRADING CO., LTD.  
P. O. Box 288, Central Osaka, Japan





Please refer to the attached current model TR-001EU Service manual.

This model is revised from current model TR-001EU, including the set stand.

The differences between current model TR-001EU and revised model TR-001EU are only the followings.

## I. COMPARATIVE PARTS LIST

CURRENT MODEL TR-001EU		REVISED MODEL TR-001EU	DESCRIPTION
SET STAND (TBL 801104)			
Add	_____	TKK 809943	① Nut
Add	_____	TKK 809942	② Bolt
Add	_____	TKK 809944	③ Clasp
Add	_____	TKK 809941	④ Stand Plate
Add	_____	TMK 81029	⑤ Felt
Add	_____	TBM 80339	⑥ "NATIONAL" Badge
MISCELLANEOUS			
Alter	TKY 34301-3	TKY 34302-3	Cabinet body complete (A)
Alter	TKY 34401-3	TKY 34402-3	Cabinet body complete (B)
Alter	EAS 3P15S	EAS 3P15SA	Speaker
IC & DIODE			
Alter	IC 32 EHD APO55 EXD22VX01	IC 32 EHD APO55G EXD22VX01	Vert. output. H. V. rectifier
CAPACITORS			
Alter	C302 TCQM05332KZN	C302 TCQM05272MZN	Polyester film, 0.0027 $\mu$ F $\pm$ 10% 50V
Alter	C307 ECE A6V200N	ECEA6V220N	Electrolytic, 220 $\mu$ F 6V
Alter	C310 ECE A6V200Y	ECEA6V200X	Electrolytic, 200 $\mu$ F 6V
RESISTORS			
Alter	R208 ERC16GK331	*R208 ERC16GK331	Solid, 330 $\Omega$ $\pm$ 10% 1/6W
		or ERC16GK102	Solid, 1K $\Omega$ $\pm$ 10% 1/6W
		or ERC16GK561	Solid, 560 $\Omega$ $\pm$ 10% 1/6W
Add	_____	*R309 ERC16GK102	Solid, 1K $\Omega$ $\pm$ 10% 1/6W
		or ERC16GK122	Solid, 1.2K $\Omega$ $\pm$ 10% 1/6W
		or ERC16GK152	Solid, 1.5K $\Omega$ $\pm$ 10% 1/6W
		or ERC16GK182	Solid, 1.8K $\Omega$ $\pm$ 10% 1/6W
		or ERC16GK222	Solid, 2.2K $\Omega$ $\pm$ 10% 1/6W
		or ERC16GK272	Solid, 2.7K $\Omega$ $\pm$ 10% 1/6W
Add	_____	R310 ERC16GK273	Solid, 27K $\Omega$ $\pm$ 10% 1/6W
Add	_____	*R412 ERC16GK103	Solid, 10K $\Omega$ $\pm$ 10% 1/6W
		or ERC16GK123	Solid, 12K $\Omega$ $\pm$ 10% 1/6W
		or ERC16GK822	Solid, 8.2K $\Omega$ $\pm$ 10% 1/6W
		or ERC16GK682	Solid, 6.8K $\Omega$ $\pm$ 10% 1/6W

NOTE \* Parts written in gothic in this Comparative Parts List are new parts.

\* R208 is used properly to compensate the performance of IC 22 (EHD APO52).

ERC16GK561 in case of IC 22 with red mark.

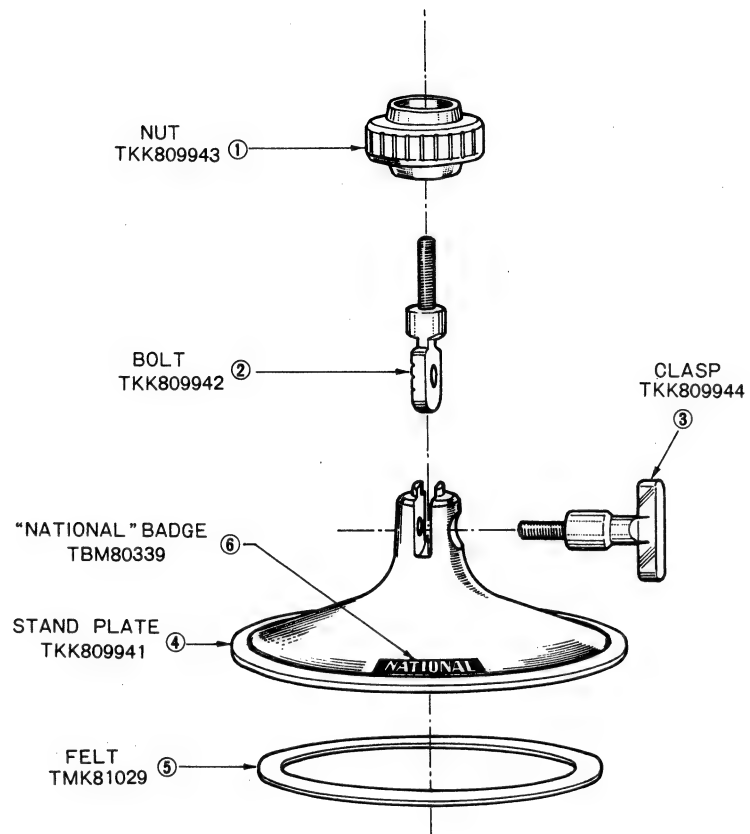
ERC16GK102 in case of IC 22 with brown mark.

ERC16GK331 in case of IC 22 with no mark.

\* R309 is used properly to compensate the performance of IC 32 (EHD APO55G).

\* R412 is used properly to compensate the performance of IC 41 (EHD SNO56).

## II. ANALYSIS DIAGRAM OF SET STAND



TO MODEL TR-001EU  
OUTPUT

3 EARTH  
2 DC + 5V  
1 CHARGE

FRONT SIDE

1 2 3

SW6 CH OFF ON  
C

SW5 CH OFF ON  
C

SW4 CH OFF ON  
C

SW7 CH OFF ON  
C

SW8 CH OFF ON  
C

TR71 2SB126 F  
or 2SB126 V

TR72 2SC828

TR73 2SC828Q

TR701 TLP 4229

D71 FR-IP

D75 16C-4B1F

D72

D74 A.V.R.

D73

D702 C74

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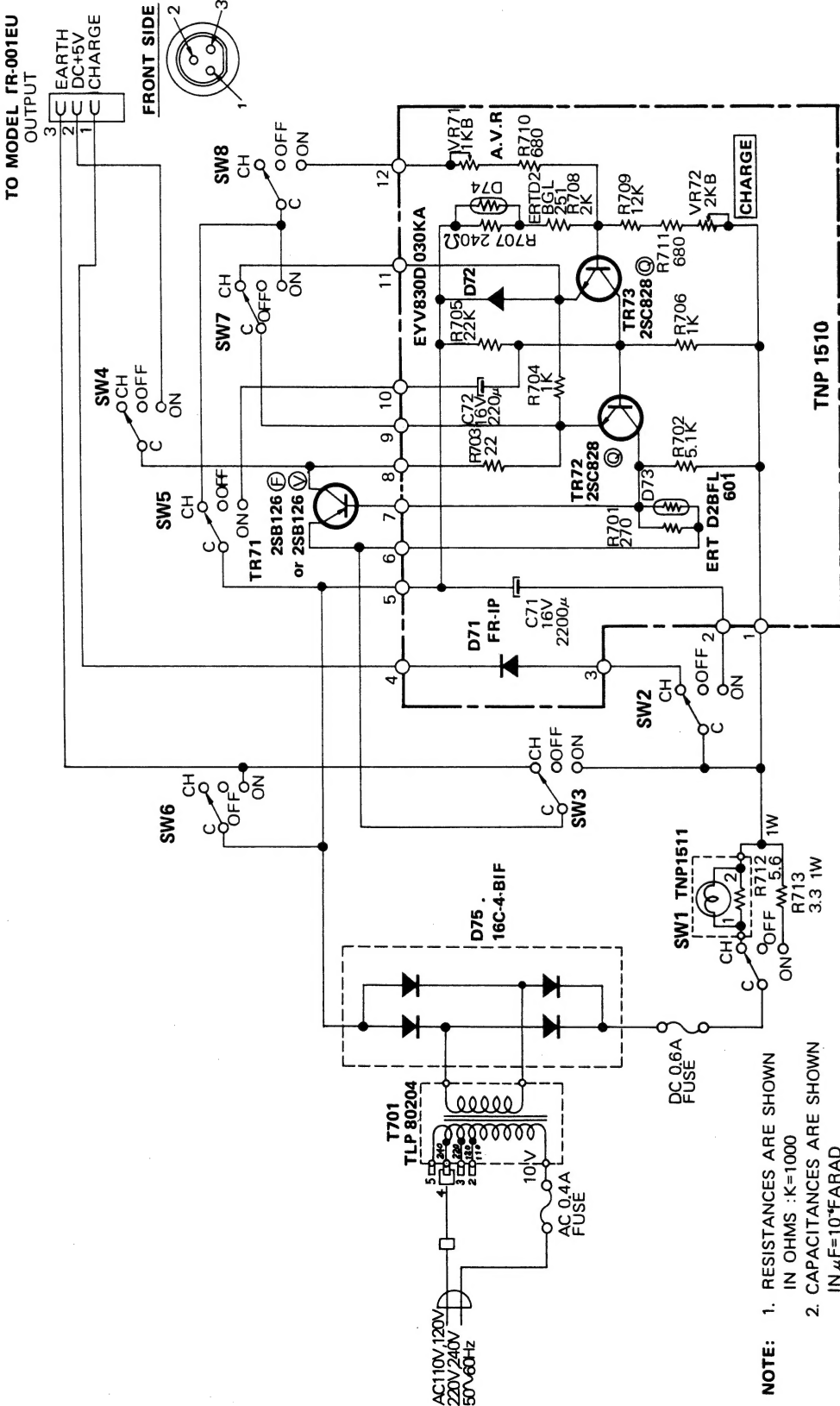
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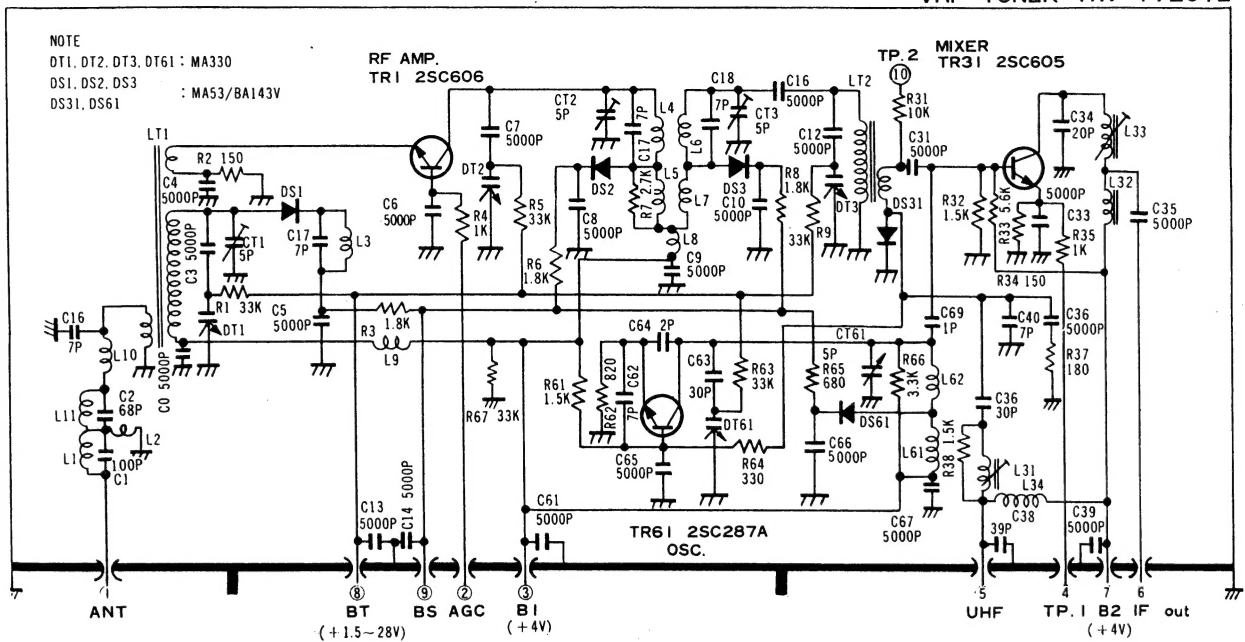
**NOTE:** 1. RESISTANCES ARE SHOWN  
IN OHMS :  $K=1000$   
2. CAPACITANCES ARE SHOWN  
IN  $\mu F=10^{-6}$  FARAD



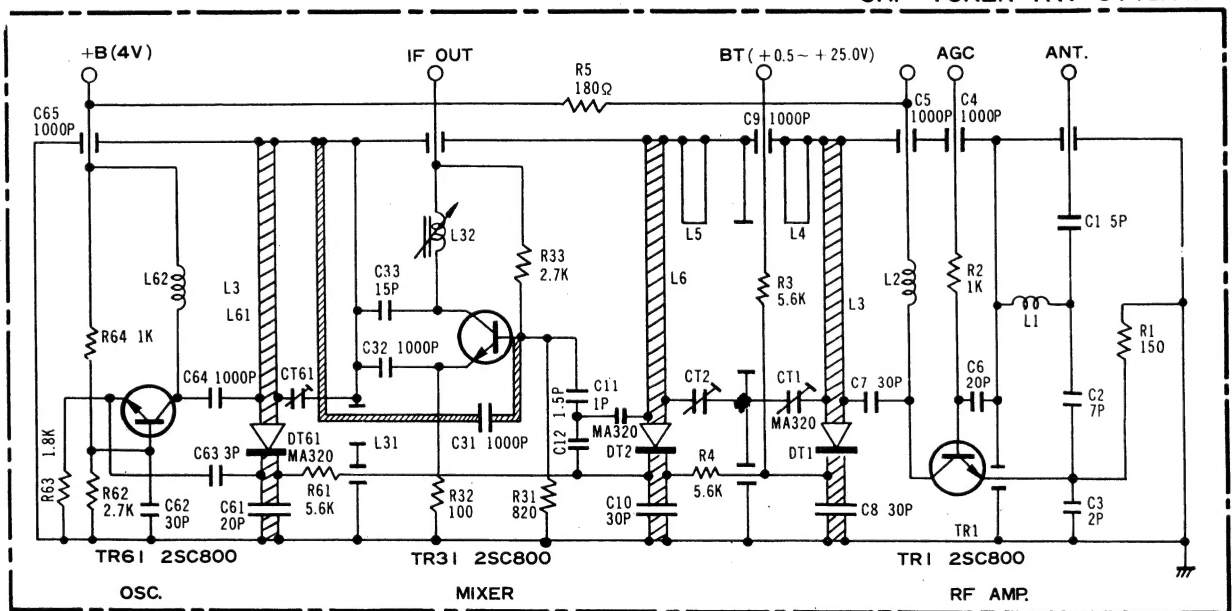
## SCHEMATIC DIAGRAM MODEL TY-196U



# VHF TUNER TNV 17201E



# UHF TUNER TNV 87121E



## NOTE:

1. RESISTANCE VALUES ARE SHOWN IN OHMS:  
K=1000 M=1000,000
2. CAPACITANCE VALUES ARE SHOWN IN  $\mu F=10^{-6}F$   
OTHERWISE NOTED P= $\mu F=10^{-12}F$
3. COIL RESISTANCE VALUES LESS THAN 1 OHM  
ARE NOT SHOWN.
4. DC VOLTAGES ARE READ WITH VACUUM TUBE  
VOLT METER AND ALL CONTROLS SET FOR NOR-  
MAL PICTURE.
5. MARKS  $\circ-\circ$  INDICATE JUNCTION POINT FOR TER-  
MINAL OF THE CIRCUIT BOARDS.
6. THE MARKED \*PARTS ARE USED PROPERLY TO  
COMPENSATE THE PERFORMANCE OF THE IC.

